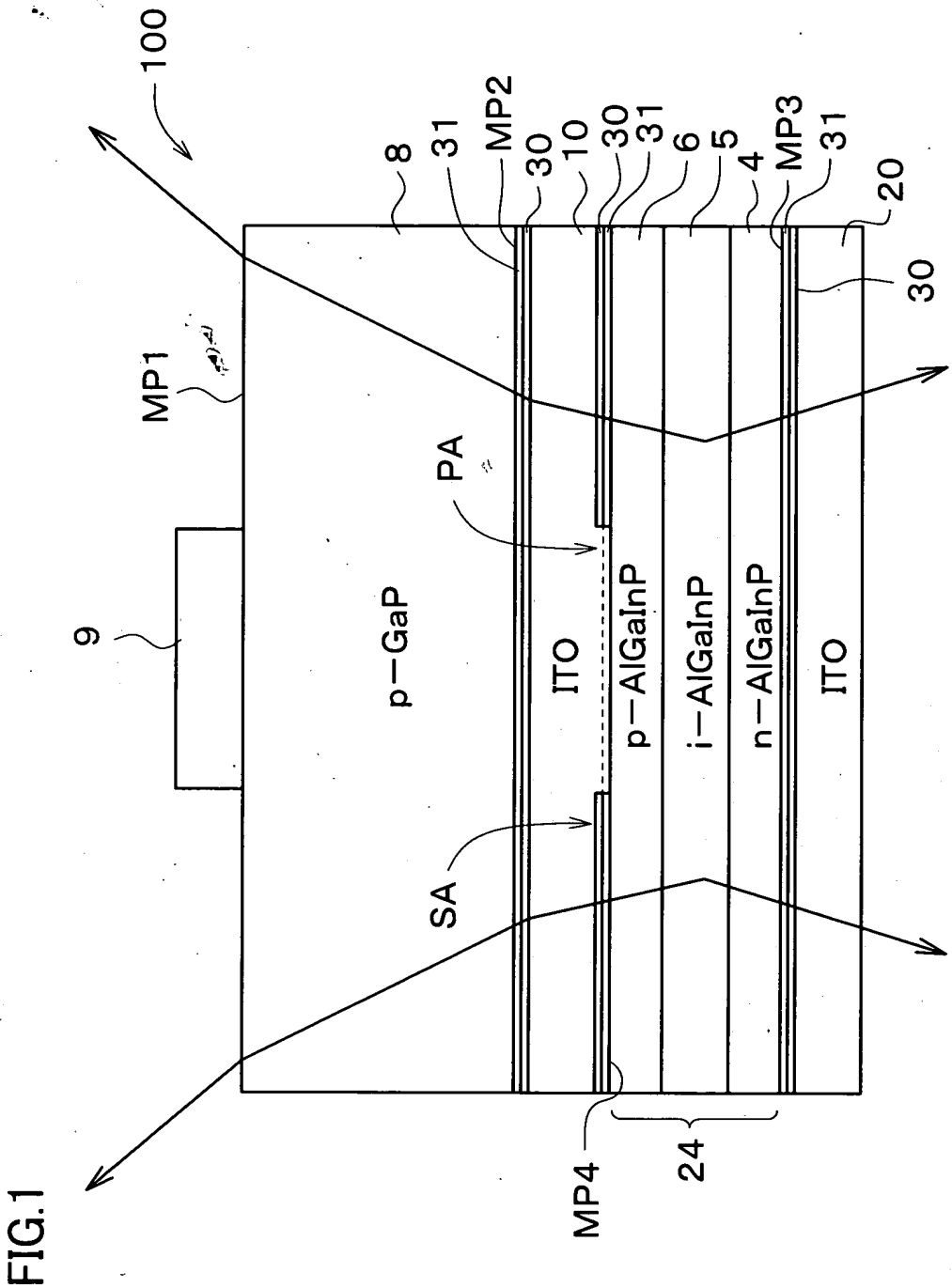

100
8
31
MP2
30
10
30
31
6
5
4
MP3
31
20
30
MP1
PA
9
p−GaP
ITO
p−AlGaInP
i−AlGaInP
n−AlGaInP
ITO
SA
MP4
24

FIG.1

FIG.2

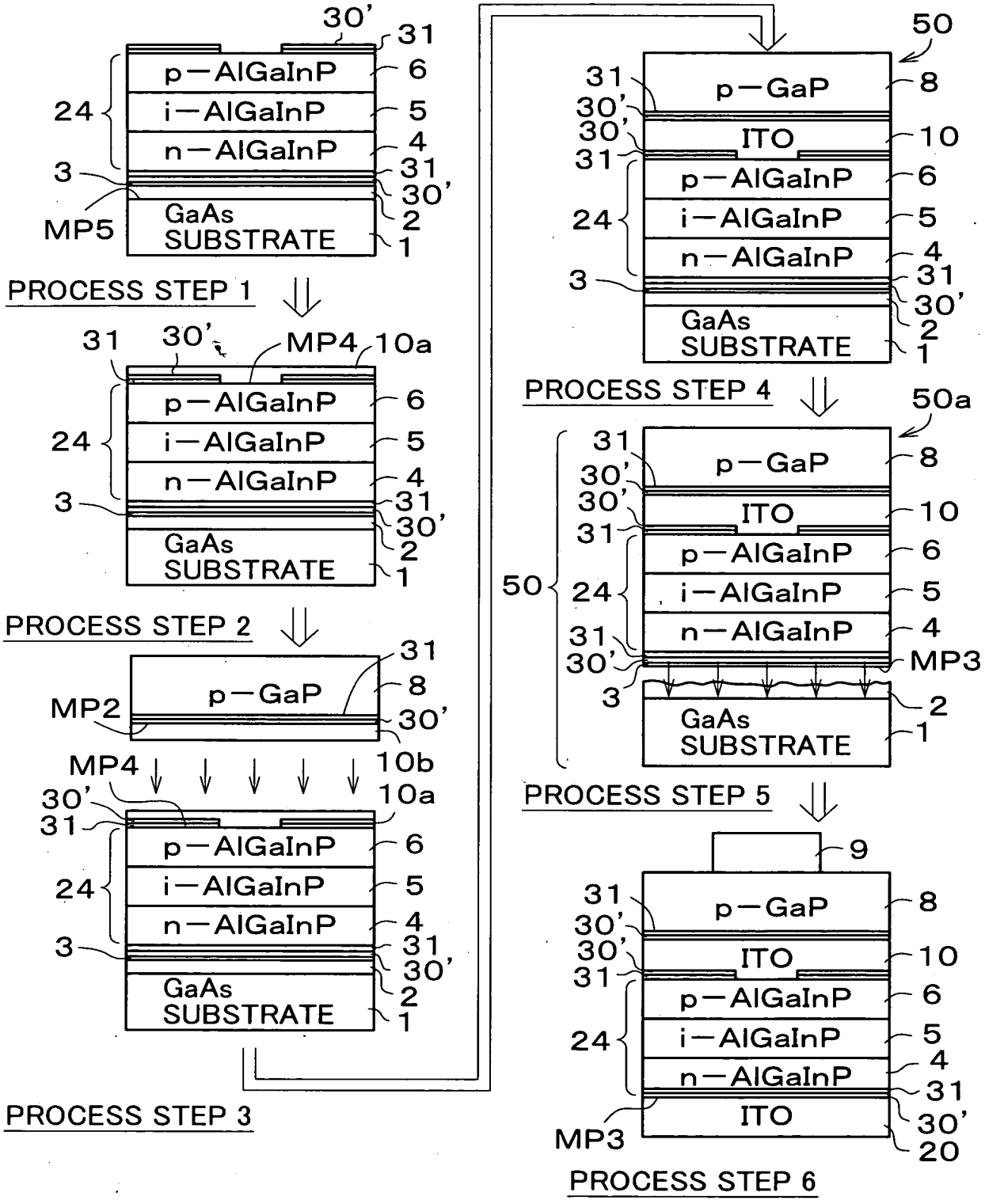

30'
31
p−AlGaInP
6
24
i−AlGaInP
5
n−AlGaInP
4
3
31
30'
MP5
GaAs SUBSTRATE
2
1
PROCESS STEP 1
31
30'
MP4
10a
PROCESS STEP 2
MP2
p−GaP
8
MP4
10b
PROCESS STEP 3
50
p−GaP
8
30'
ITO
10
PROCESS STEP 4
50a
MP3
PROCESS STEP 5
9
20
PROCESS STEP 6

FIG.3

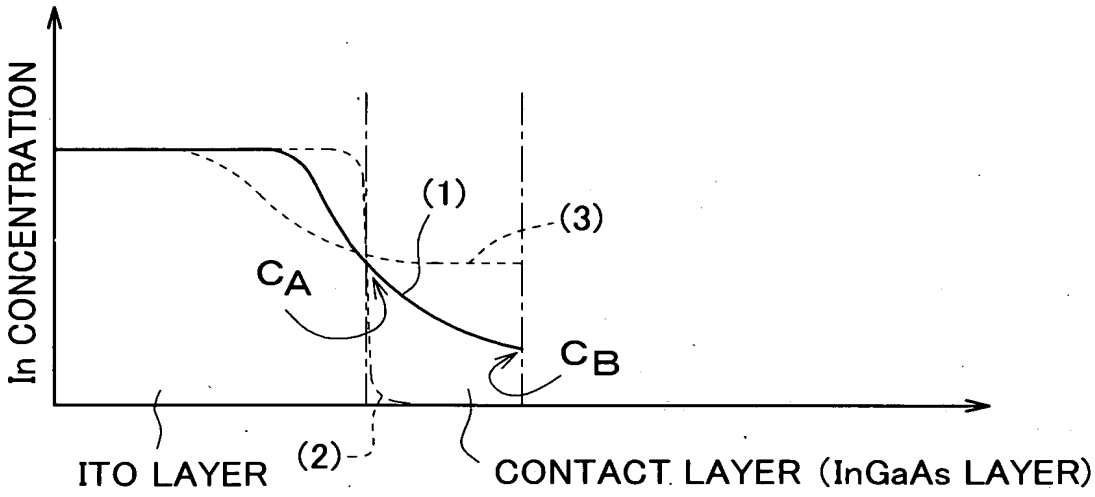

In CONCENTRATION
(1)
(3)
$C_A$
$C_B$
(2)
ITO LAYER
CONTACT LAYER (InGaAs LAYER)

FIG.4

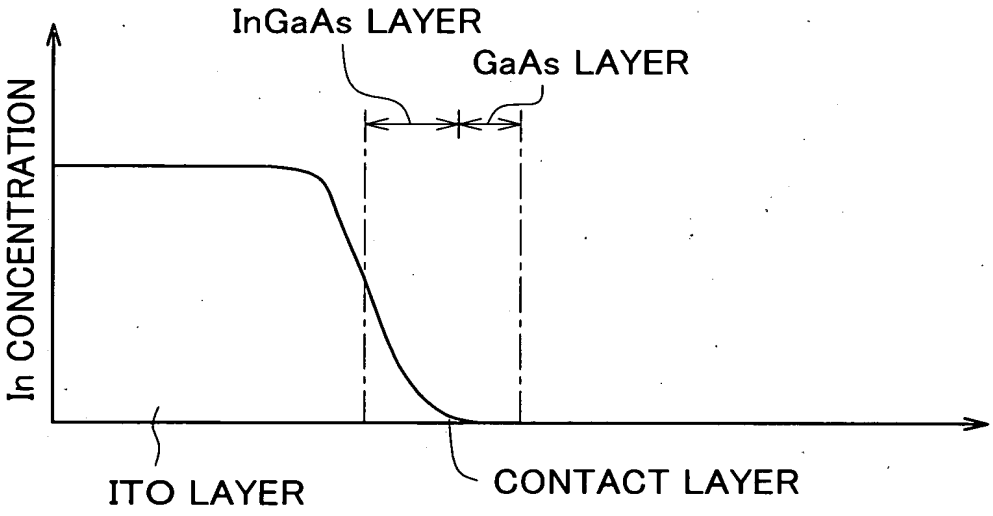

InGaAs LAYER
GaAs LAYER
In CONCENTRATION
ITO LAYER
CONTACT LAYER

FIG.5

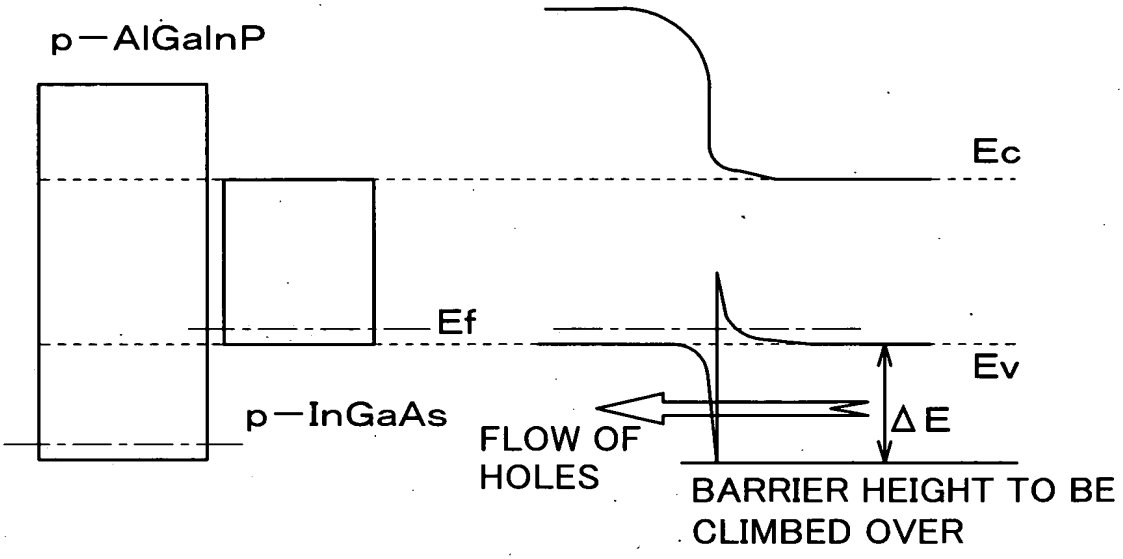

p−AlGaInP
Ec
Ef
Ev
p−InGaAs
ΔE
FLOW OF HOLES
BARRIER HEIGHT TO BE CLIMBED OVER
(BEFORE BONDING)
(AFTER BONDING)

FIG.6

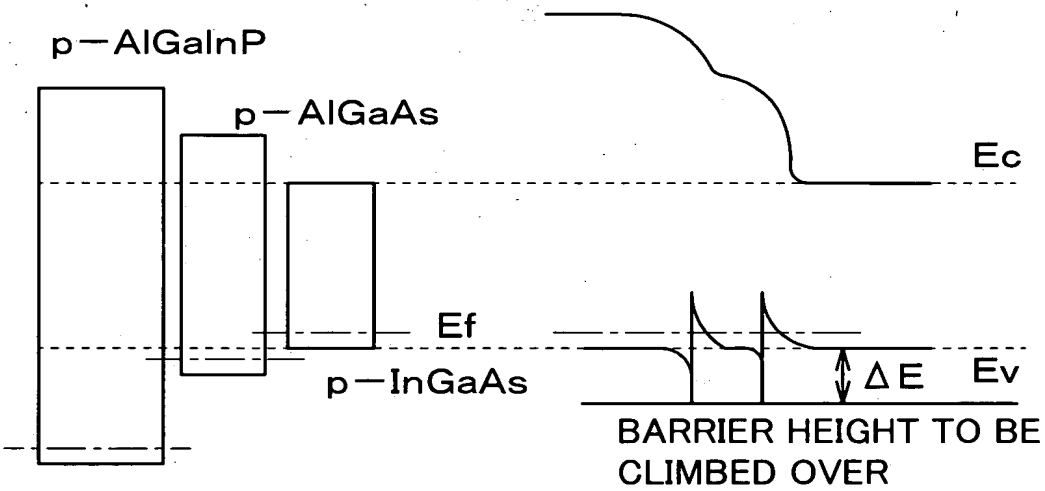

p−AlGaInP
p−AlGaAs
Ec
Ef
p−InGaAs
ΔE
Ev
BARRIER HEIGHT TO BE CLIMBED OVER
(BEFORE BONDING)
(AFTER BONDING)

FIG.7A

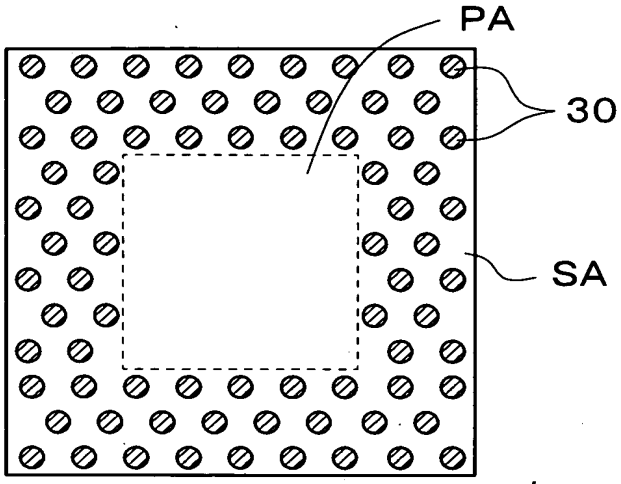



FIG.7B

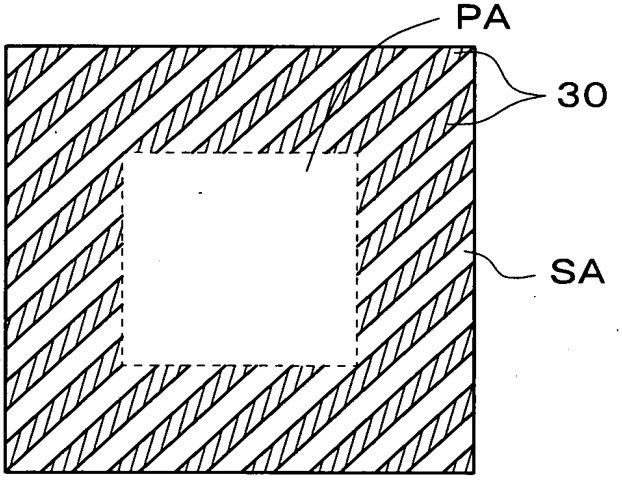
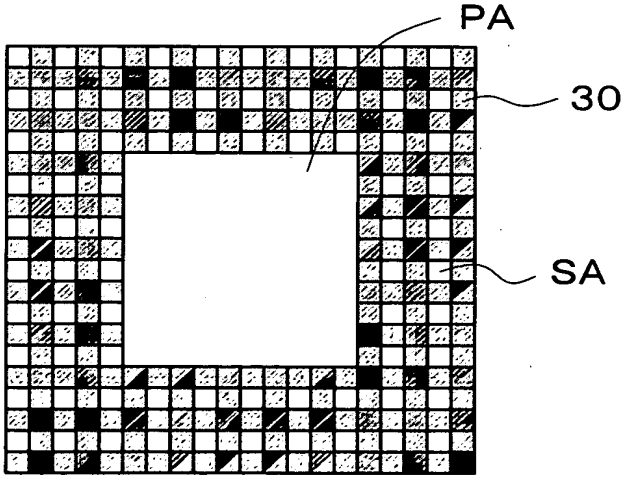



FIG.7C



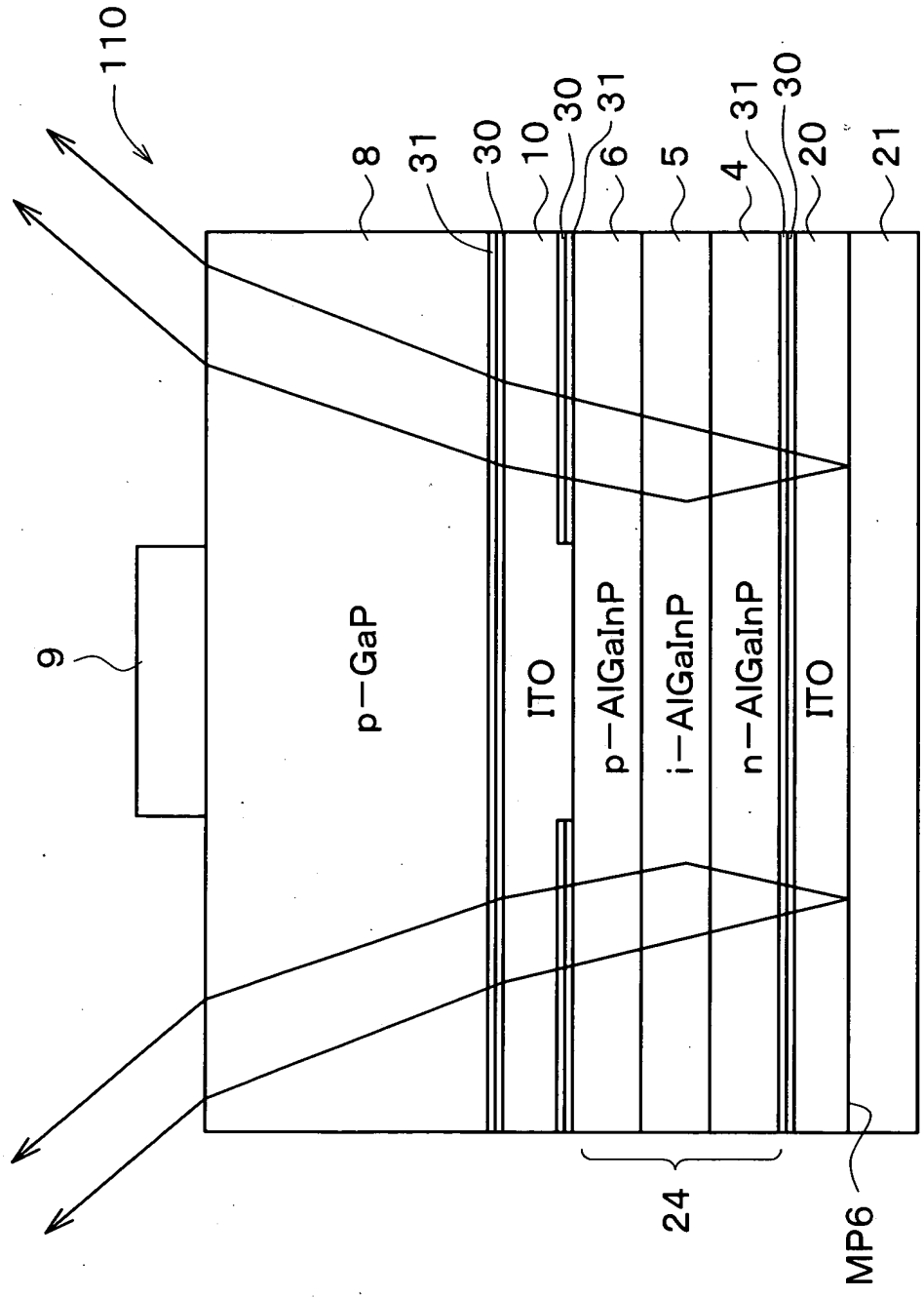

110
8
31
30
10
30
31
6
5
4
31
30
20
21
9
p−GaP
ITO
p−AlGaInP
i−AlGaInP
n−AlGaInP
ITO
24
MP6

FIG.8

FIG.9

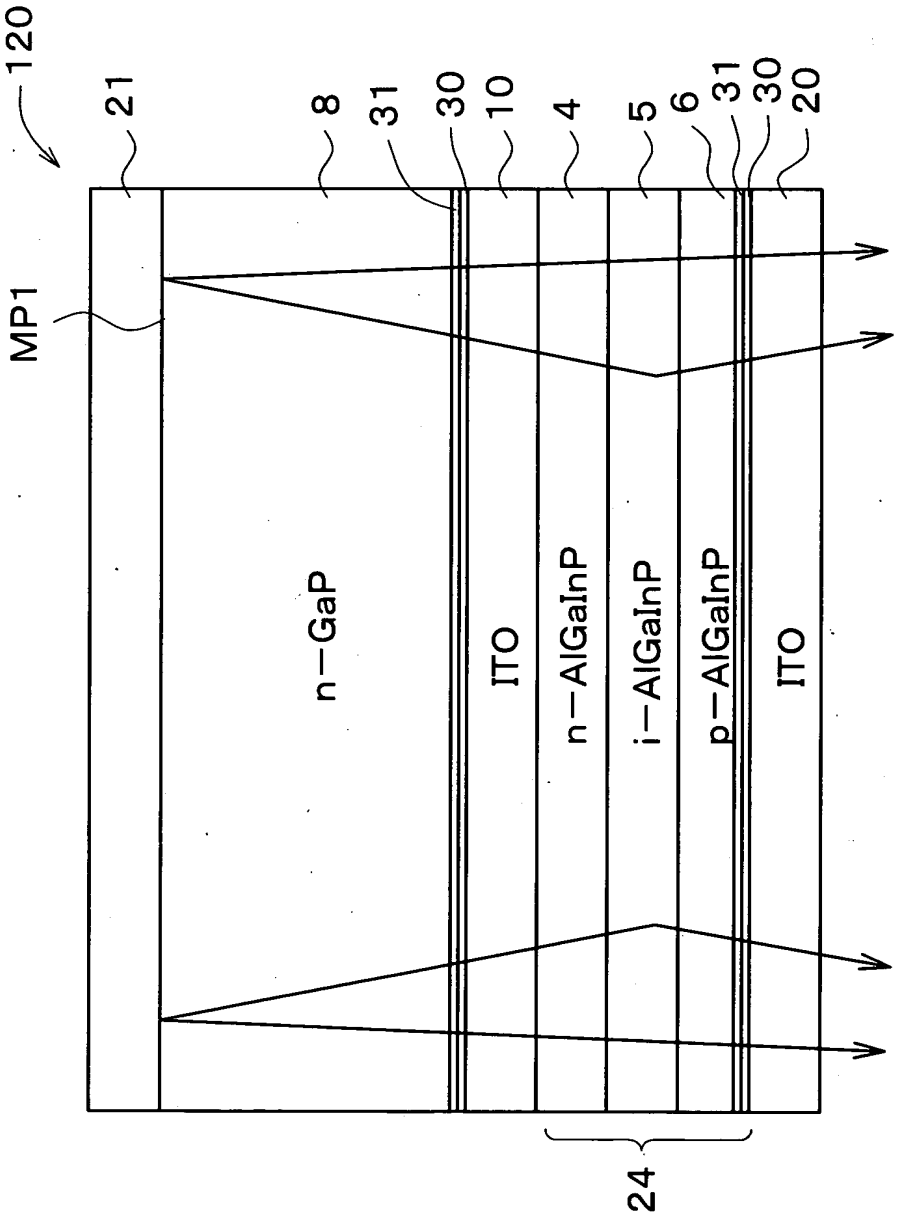
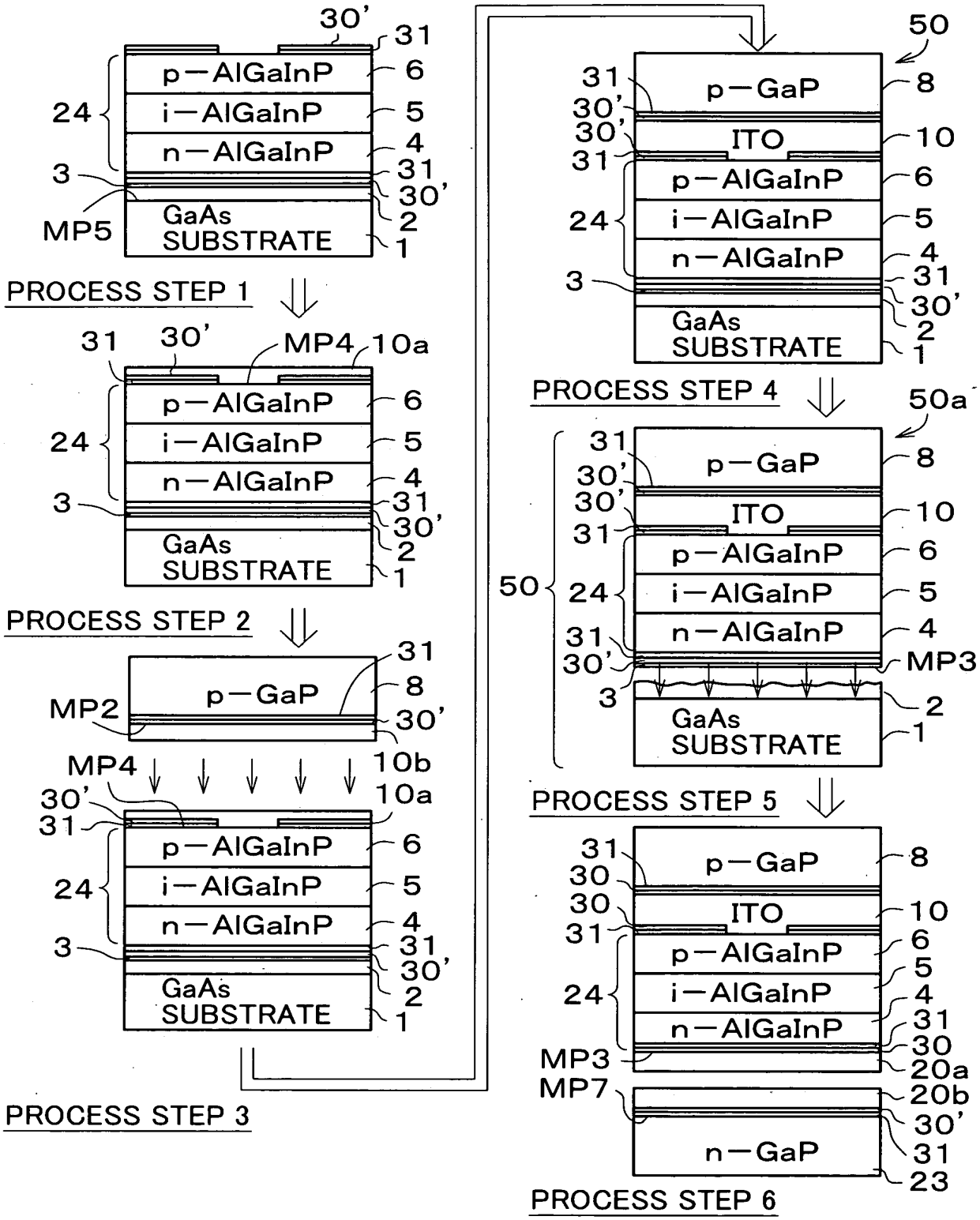

120
21
8
31
30
10
4
5
6
31
30
20
MP1
n−GaP
ITO
n−AlGaInP
i−AlGaInP
p−AlGaInP
ITO
24

FIG.10


30'
31
p−AlGaInP
6
24
i−AlGaInP
5
n−AlGaInP
4
3
31
30'
MP5
GaAs SUBSTRATE
2
1
PROCESS STEP 1
31
30'
MP4
10a
PROCESS STEP 2
p−GaP
8
MP2
10b
PROCESS STEP 3
50
ITO
10
MP3
20a
MP7
20b
23
PROCESS STEP 4
50a
PROCESS STEP 5
PROCESS STEP 6

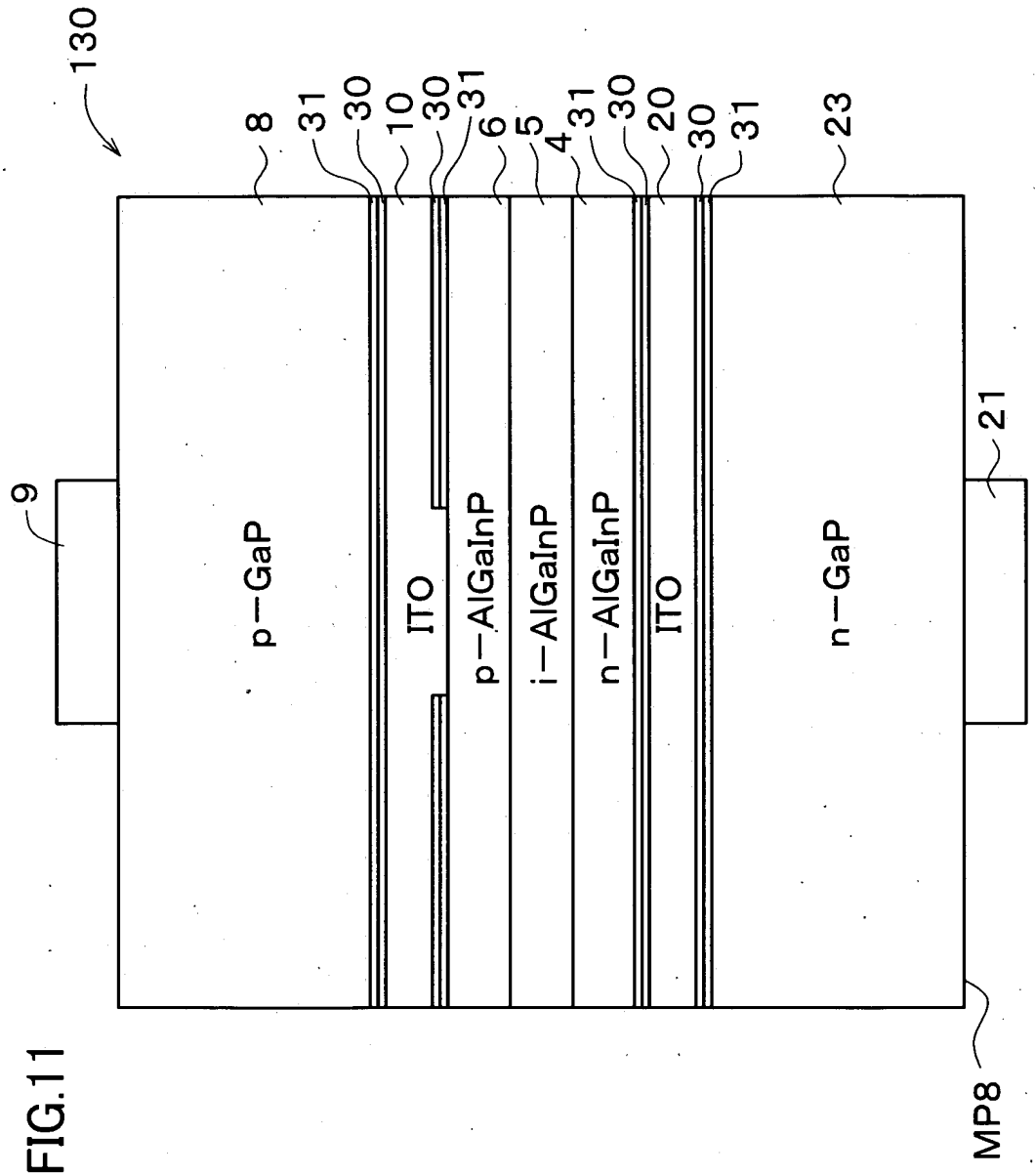

130
8
31
30
10
30
31
6
5
4
31
30
20
30
31
23
9
21
p−GaP
ITO
p−AlGaInP
i−AlGaInP
n−AlGaInP
ITO
n−GaP
MP8

FIG.11

FIG.12

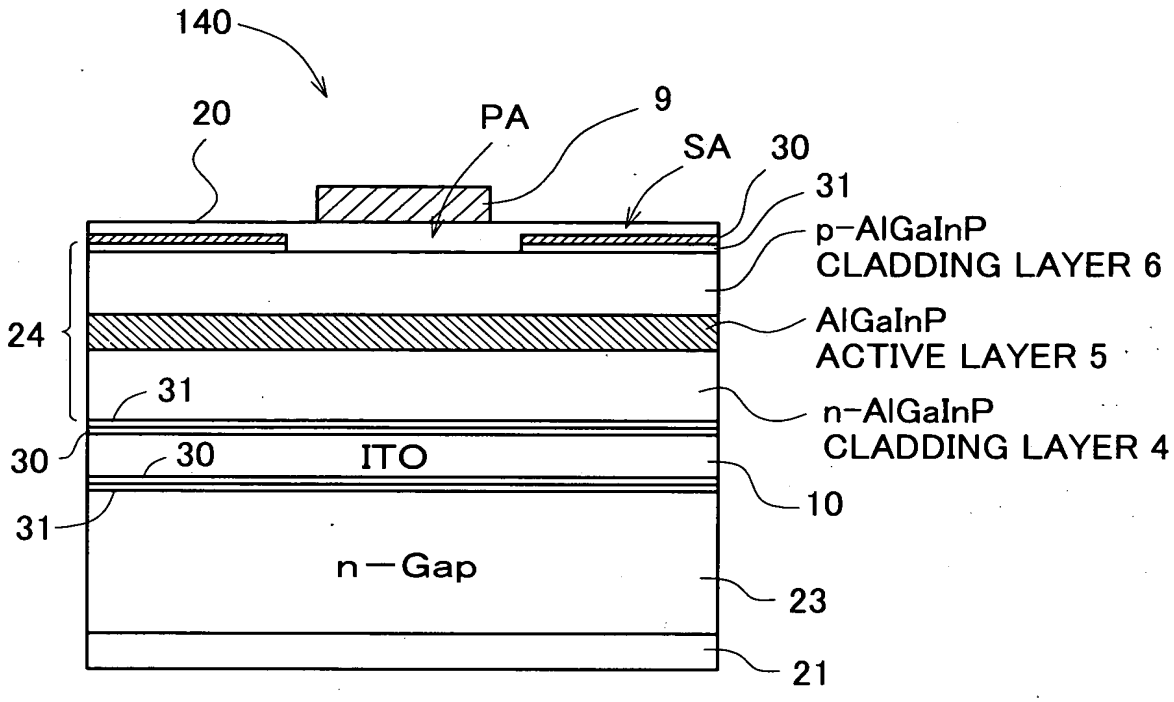

140
20
PA
9
SA
30
31
p-AlGaInP
CLADDING LAYER 6
24
AlGaInP
ACTIVE LAYER 5
31
n-AlGaInP
CLADDING LAYER 4
30
30
ITO
10
31
n—Gap
23
21

FIG.13

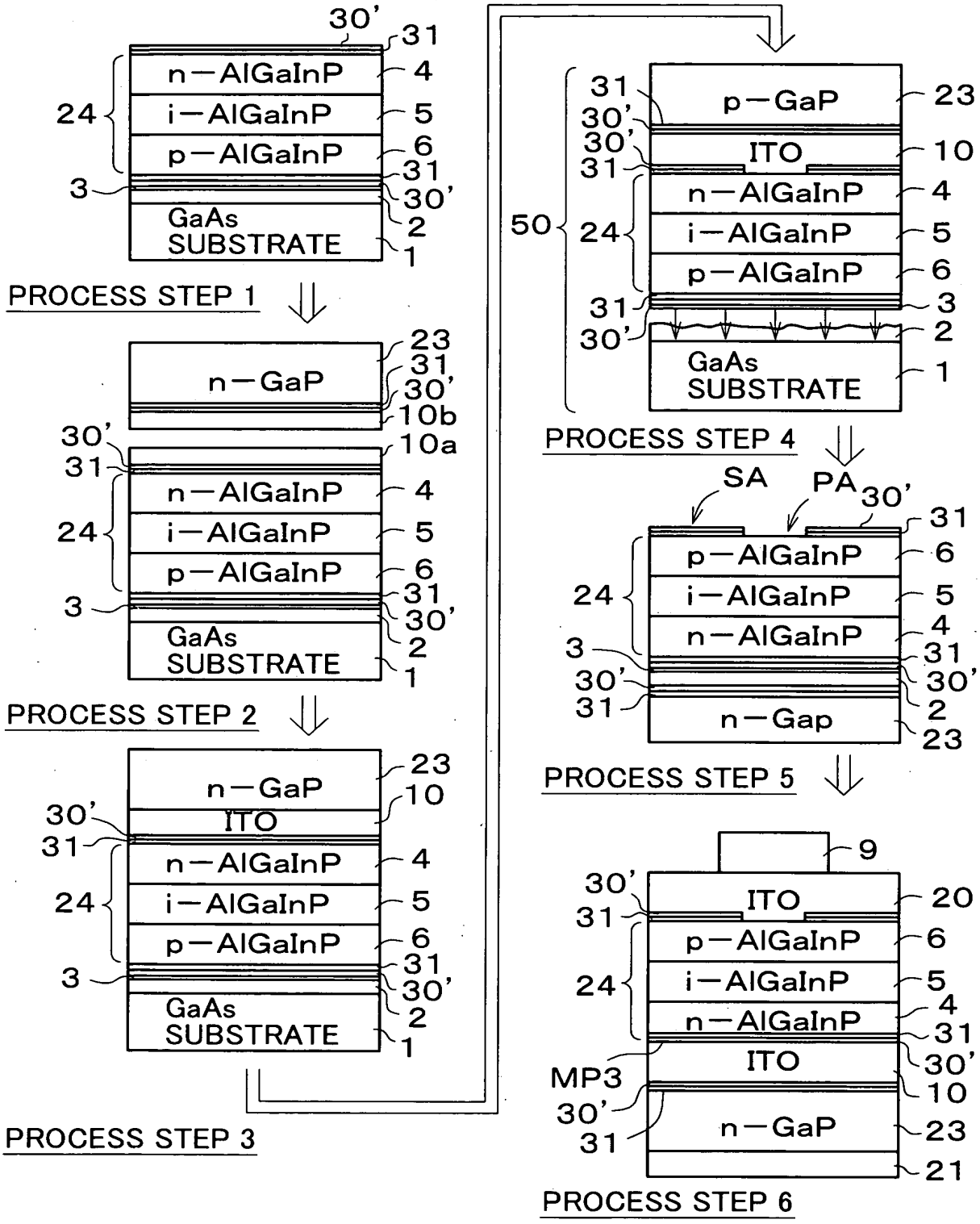

30'
31
n−AlGaInP
4
24
i−AlGaInP
5
p−AlGaInP
6
3
31
30'
GaAs SUBSTRATE
2
1
PROCESS STEP 1
n−GaP
23
31
30'
10b
10a
PROCESS STEP 2
ITO
10
PROCESS STEP 3
50
p−GaP
23
PROCESS STEP 4
SA
PA
n−Gap
PROCESS STEP 5
9
20
MP3
PROCESS STEP 6

FIG.14

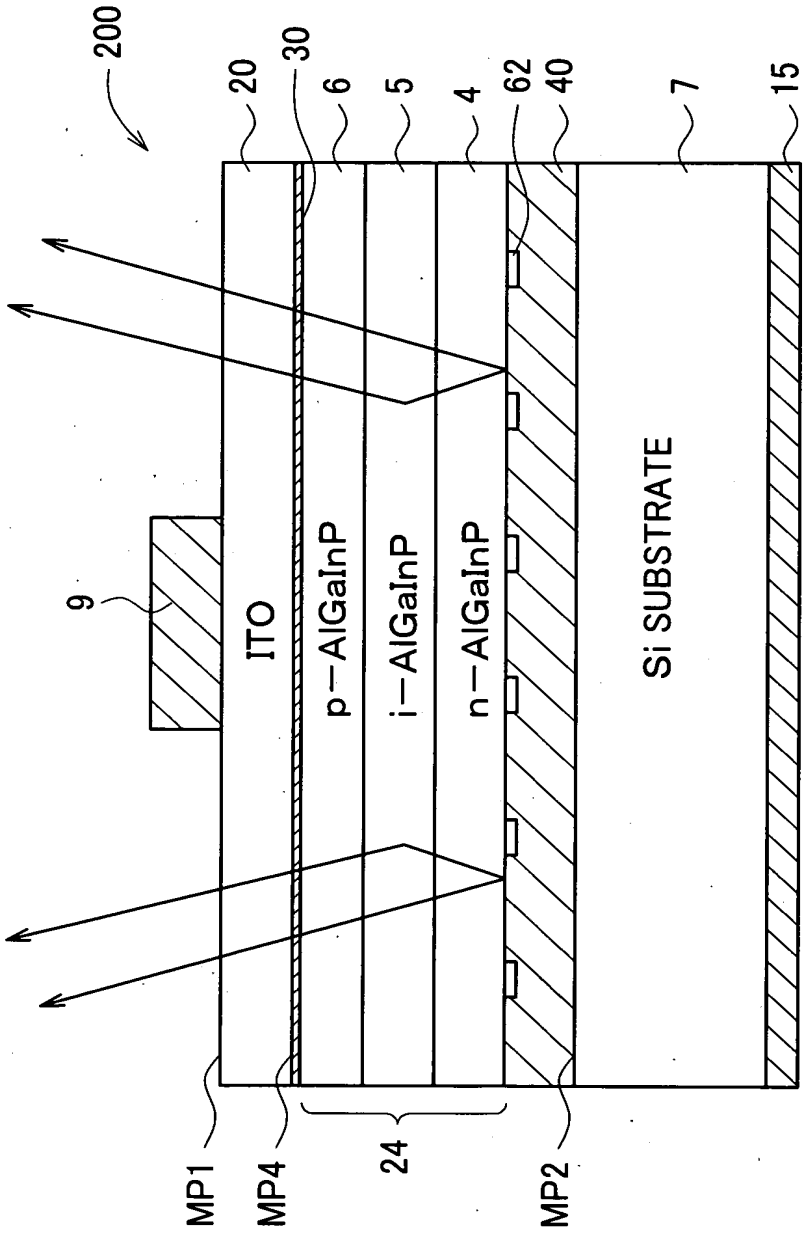

200
20
30
6
5
4
62
40
7
15
9
ITO
p−AlGaInP
i−AlGaInP
n−AlGaInP
Si SUBSTRATE
MP1
MP4
24
MP2

FIG.15

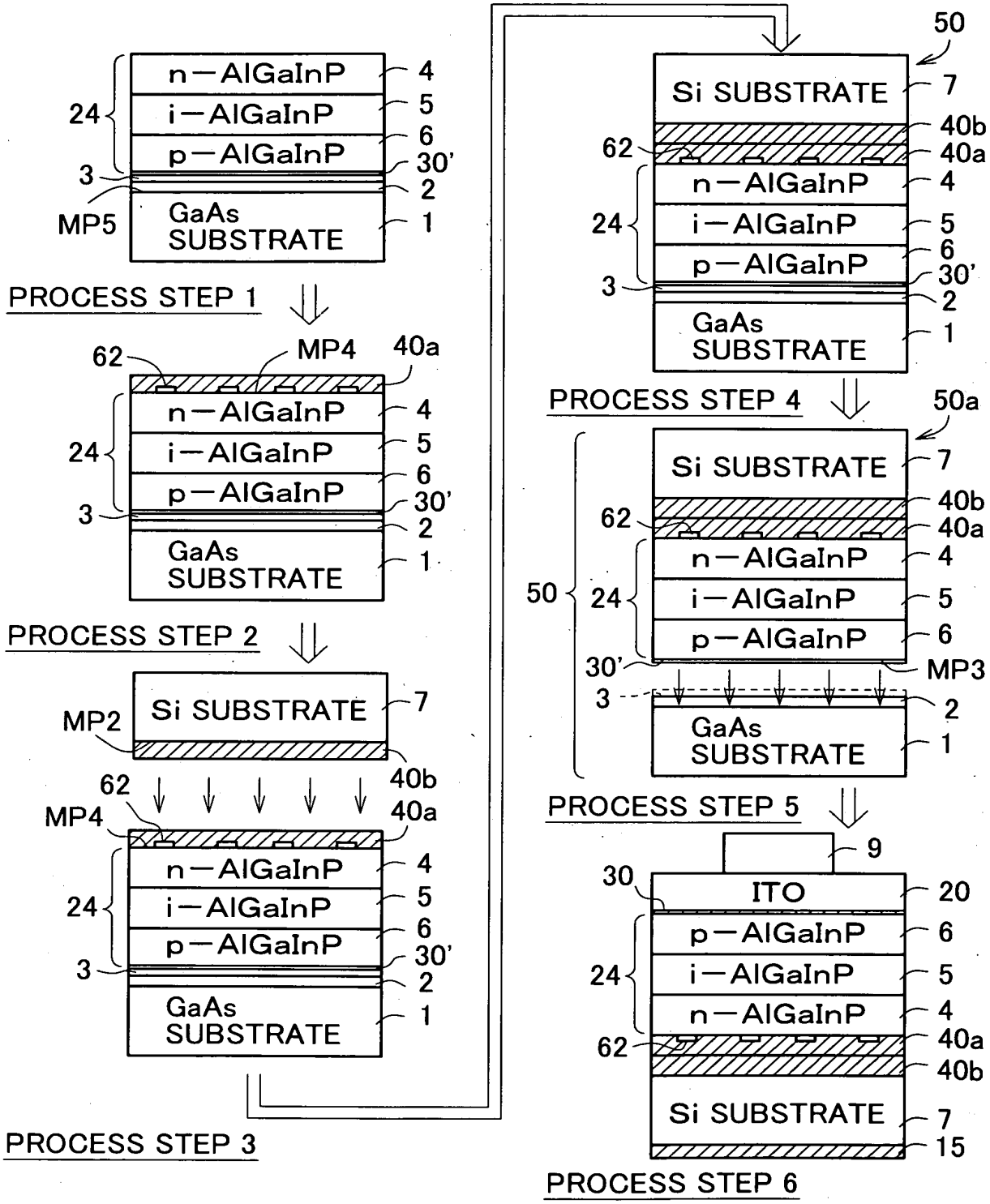

n−AlGaInP
i−AlGaInP
p−AlGaInP
GaAs SUBSTRATE
Si SUBSTRATE
ITO
MP2
MP3
MP4
MP5
PROCESS STEP 1
PROCESS STEP 2
PROCESS STEP 3
PROCESS STEP 4
PROCESS STEP 5
PROCESS STEP 6

FIG.16

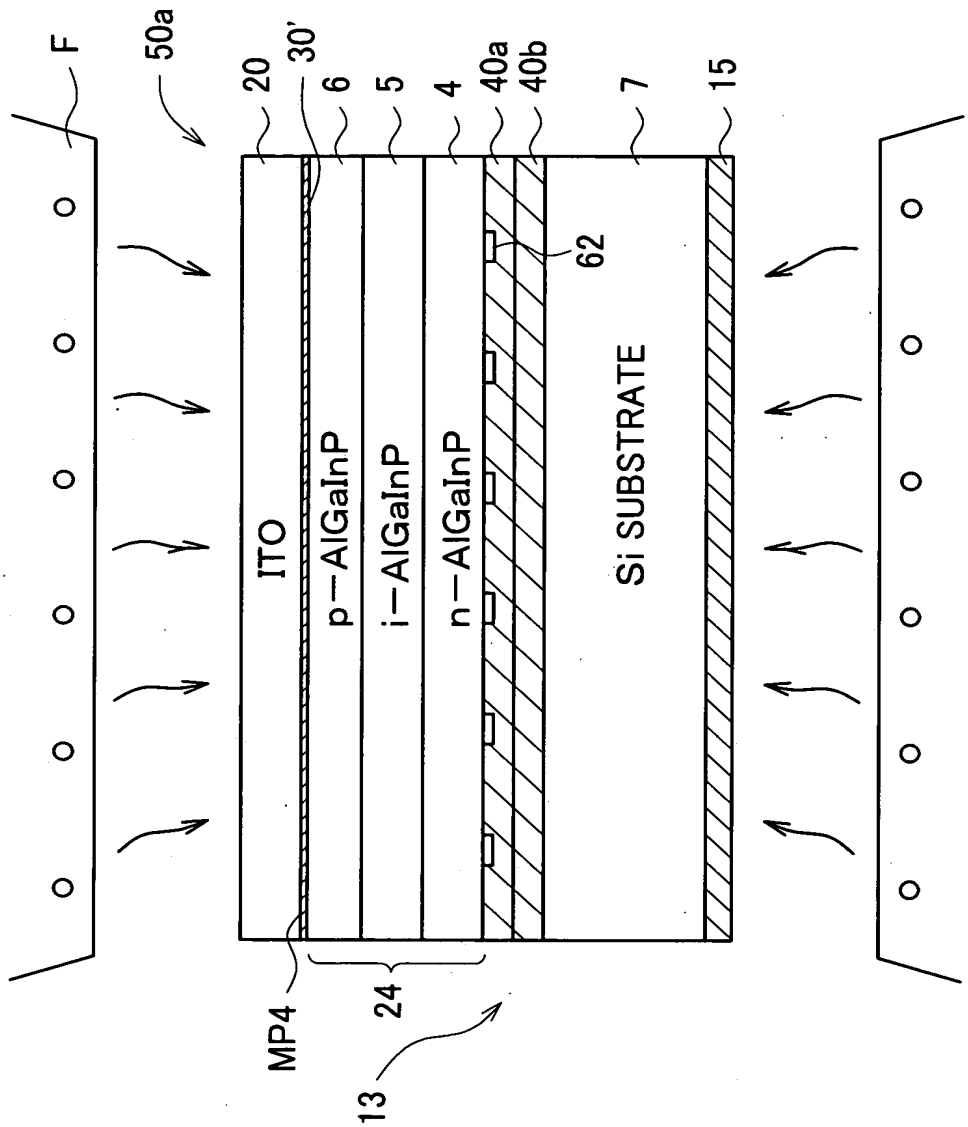

F
50a
20
30'
6
5
4
40a
40b
7
15
62
ITO
p−AlGaInP
i−AlGaInP
n−AlGaInP
Si SUBSTRATE
MP4
24
13

FIG.17

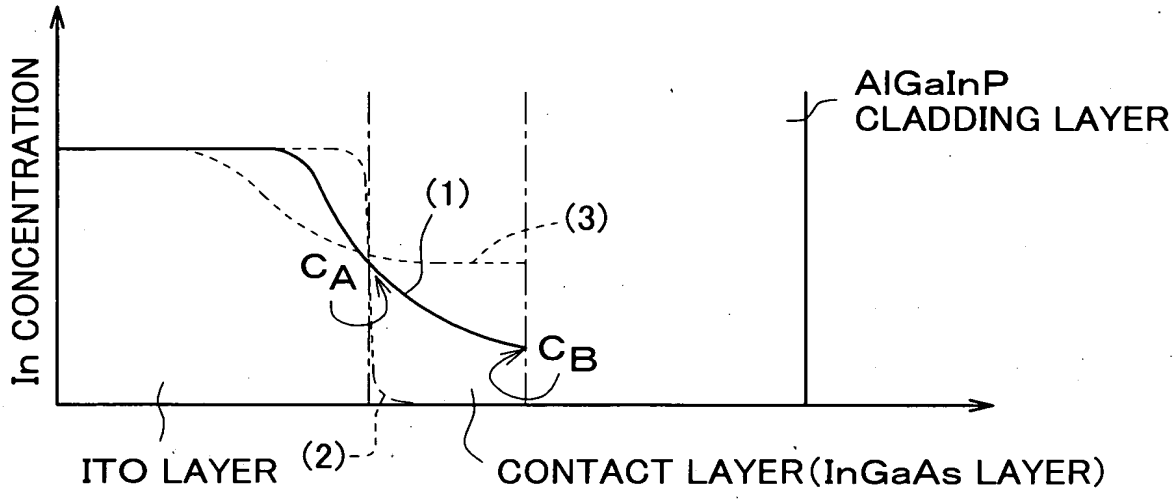

In CONCENTRATION
AlGaInP
CLADDING LAYER
(1)
(3)
$C_A$
$C_B$
ITO LAYER
(2)
CONTACT LAYER(InGaAs LAYER)

FIG.18

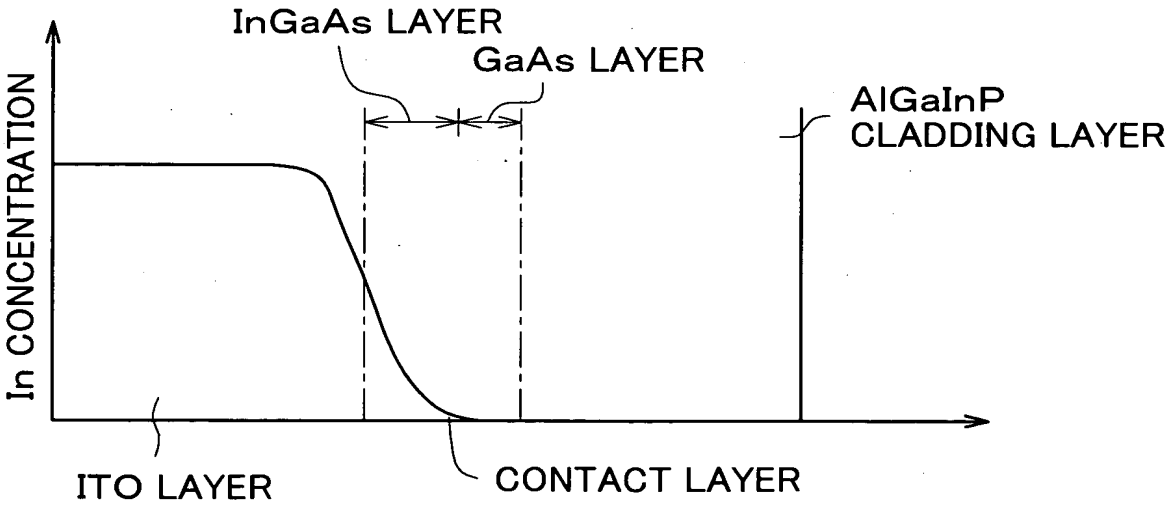

InGaAs LAYER
GaAs LAYER
In CONCENTRATION
AlGaInP
CLADDING LAYER
ITO LAYER
CONTACT LAYER

FIG.19

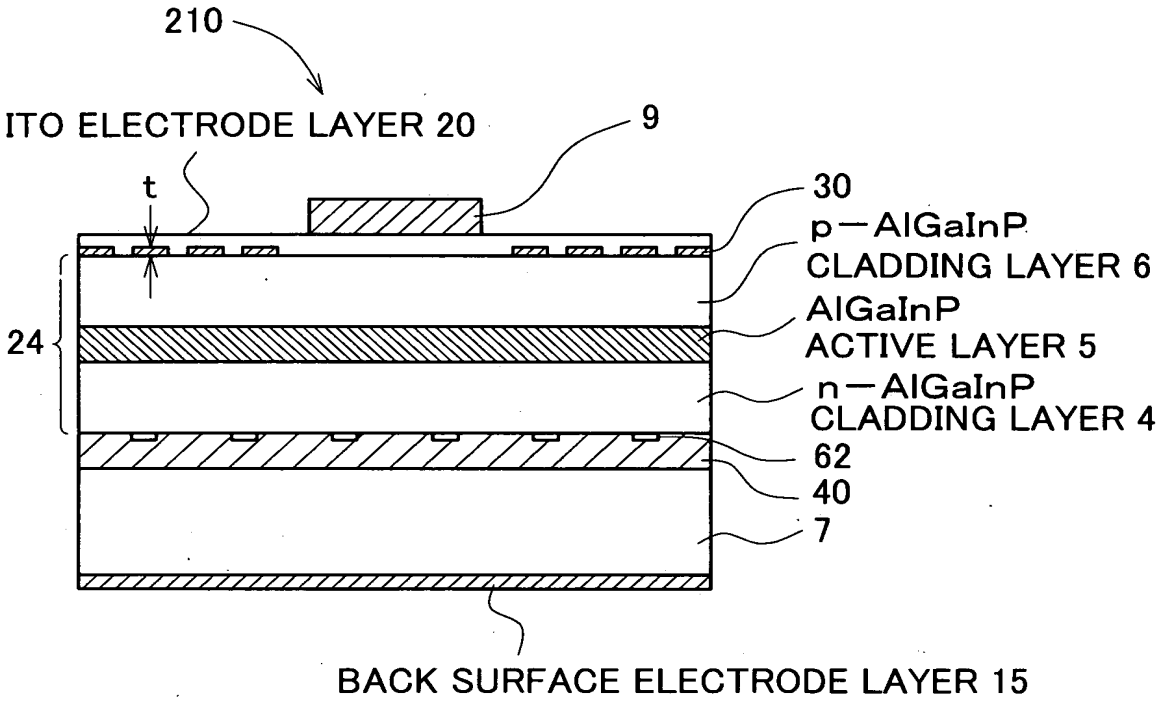

210
ITO ELECTRODE LAYER 20
9
t
30
p—AlGaInP
CLADDING LAYER 6
AlGaInP
ACTIVE LAYER 5
24
n—AlGaInP
CLADDING LAYER 4
62
40
7
BACK SURFACE ELECTRODE LAYER 15

FIG.20

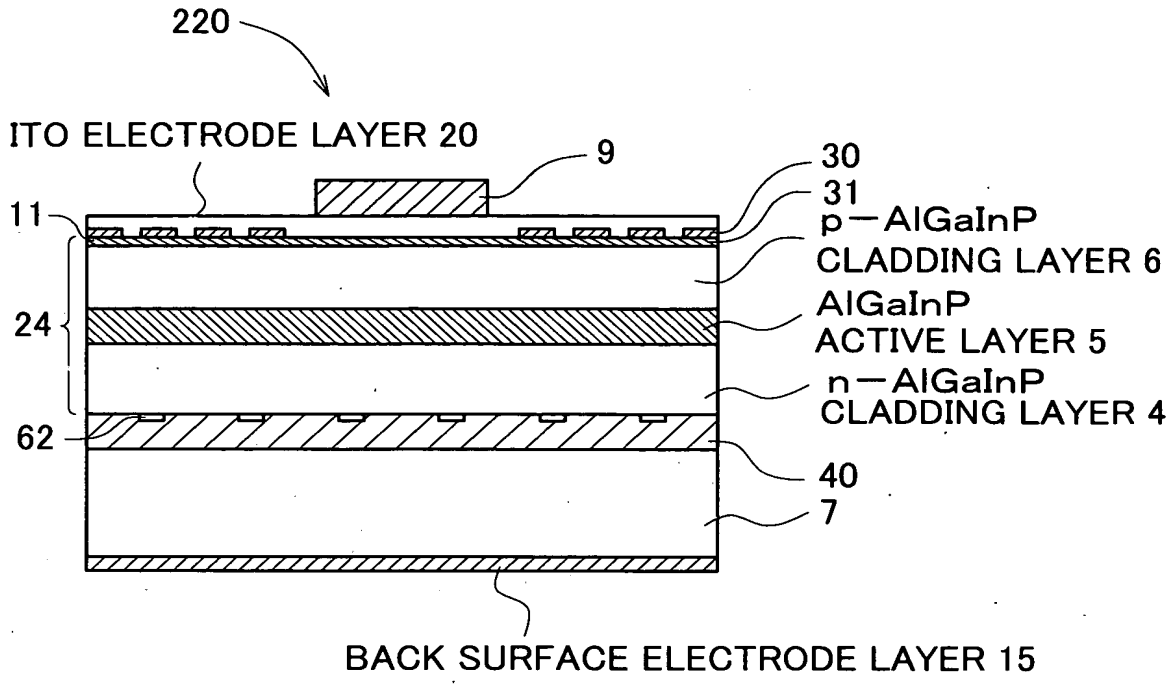

220
ITO ELECTRODE LAYER 20
9
30
31
11
p−AlGaInP
CLADDING LAYER 6
AlGaInP
24
ACTIVE LAYER 5
n−AlGaInP
CLADDING LAYER 4
62
40
7
BACK SURFACE ELECTRODE LAYER 15

FIG.21

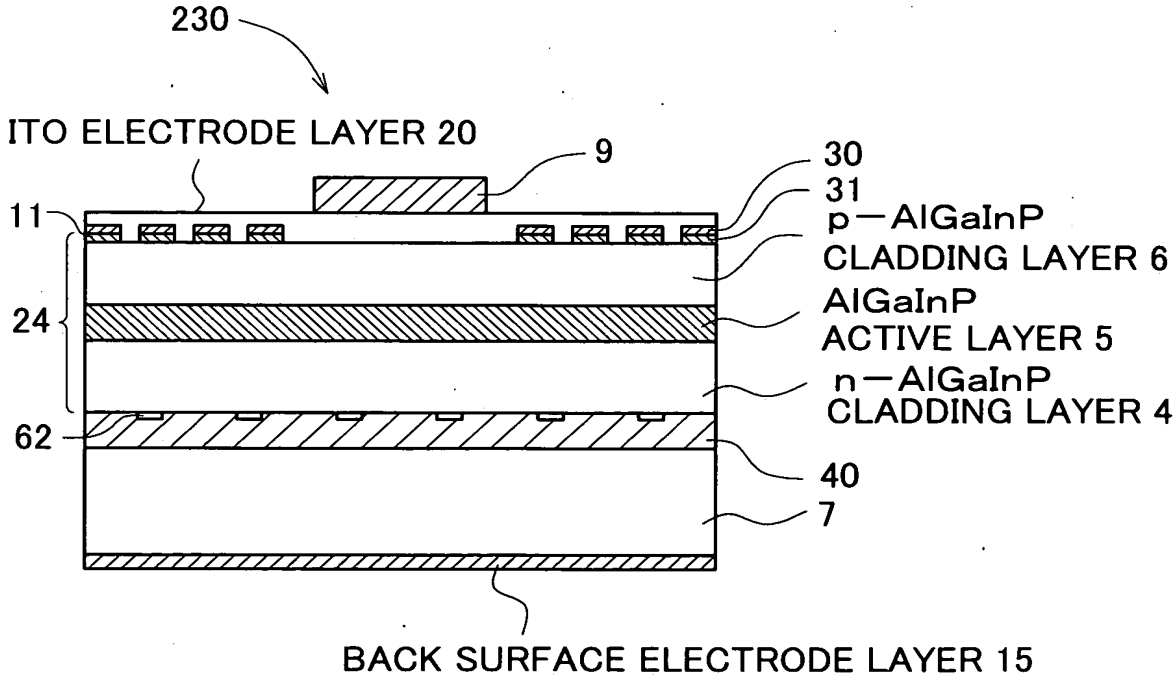

230
ITO ELECTRODE LAYER 20
9
30
31
11
p−AlGaInP
CLADDING LAYER 6
AlGaInP
24
ACTIVE LAYER 5
n−AlGaInP
CLADDING LAYER 4
62
40
7
BACK SURFACE ELECTRODE LAYER 15

FIG.22

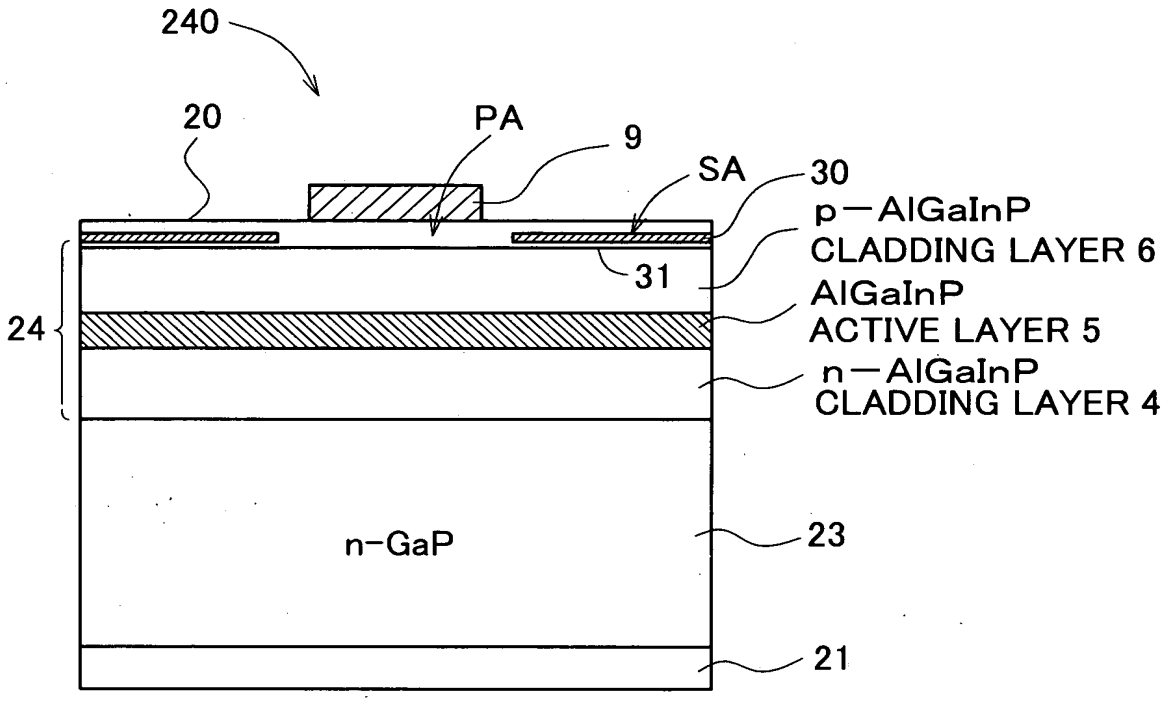

240
20
PA
9
SA
30
p−AlGaInP
CLADDING LAYER 6
31
AlGaInP
ACTIVE LAYER 5
24
n−AlGaInP
CLADDING LAYER 4
n−GaP
23
21

FIG.23

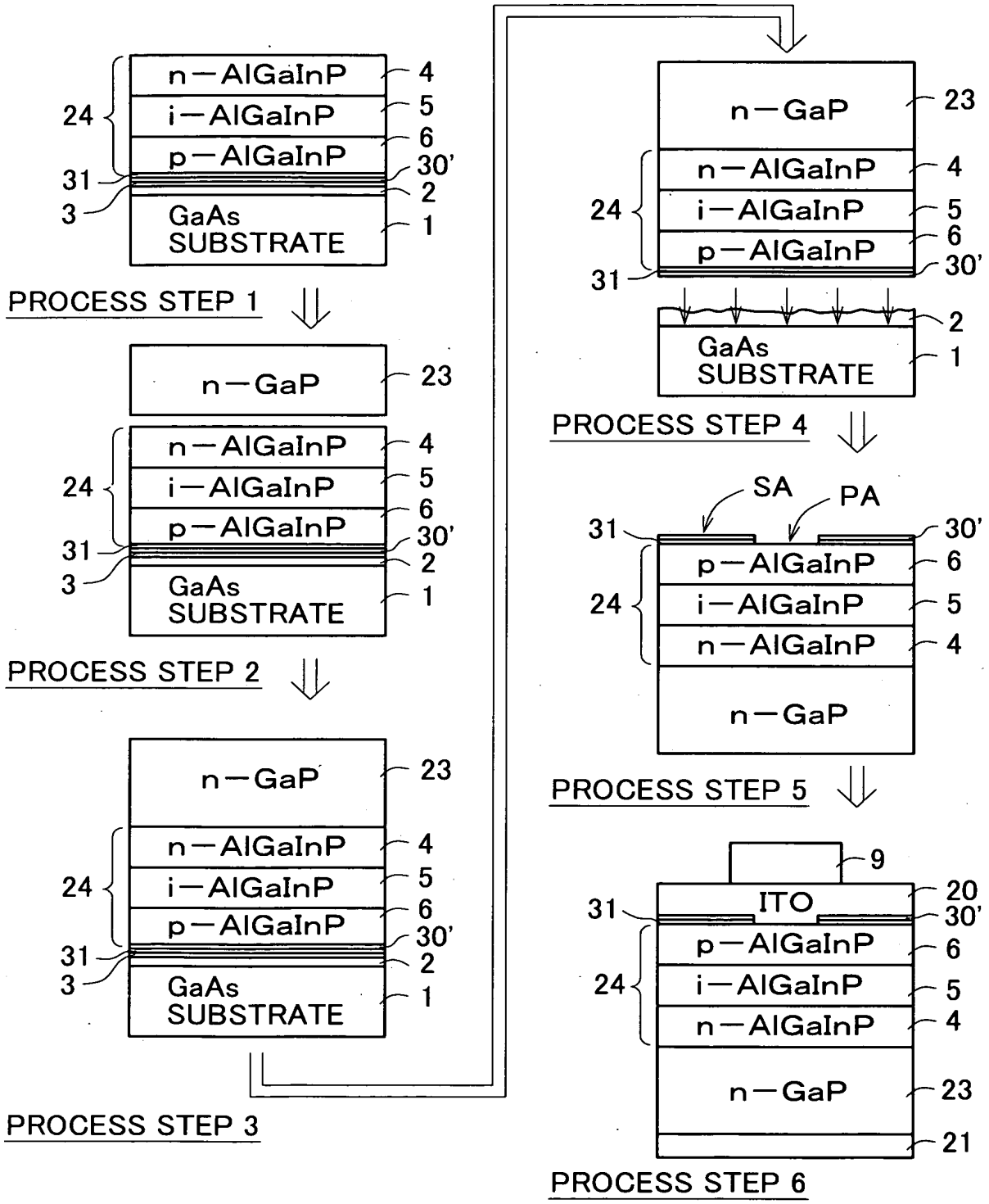

n−AlGaInP
i−AlGaInP
p−AlGaInP
GaAs SUBSTRATE
n−GaP
ITO
SA
PA
24
31
3
4
5
6
30'
2
1
23
9
20
21
PROCESS STEP 1
PROCESS STEP 2
PROCESS STEP 3
PROCESS STEP 4
PROCESS STEP 5
PROCESS STEP 6

FIG.24

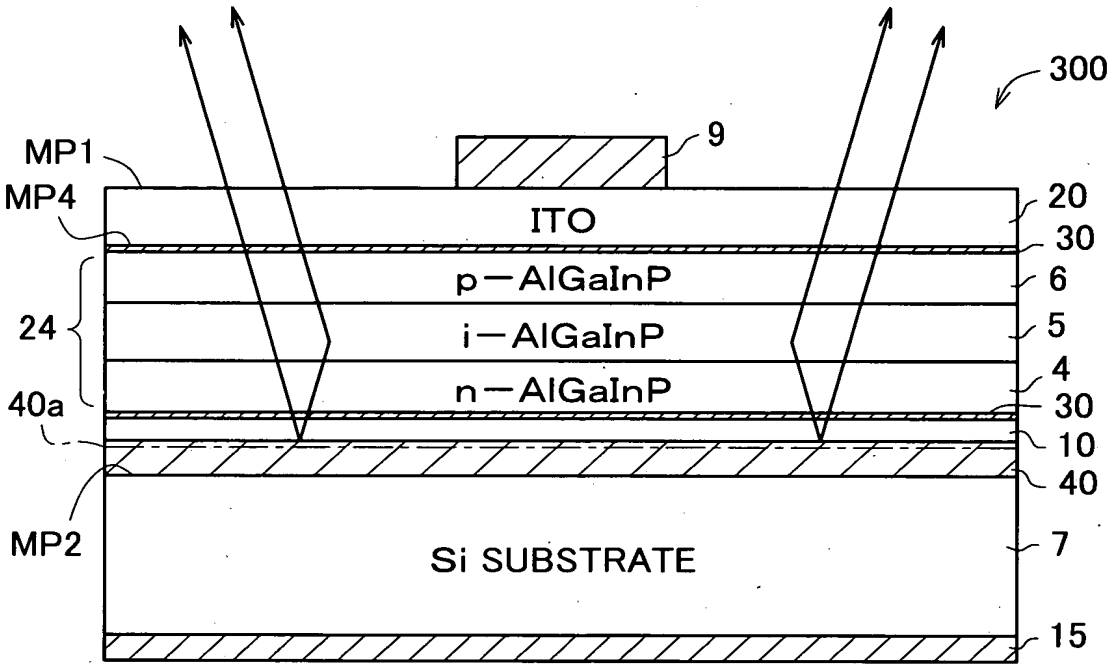

300
9
MP1
MP4
ITO
20
30
p—AlGaInP
6
24
i—AlGaInP
5
n—AlGaInP
4
40a
30
10
40
MP2
Si SUBSTRATE
7
15

FIG.25

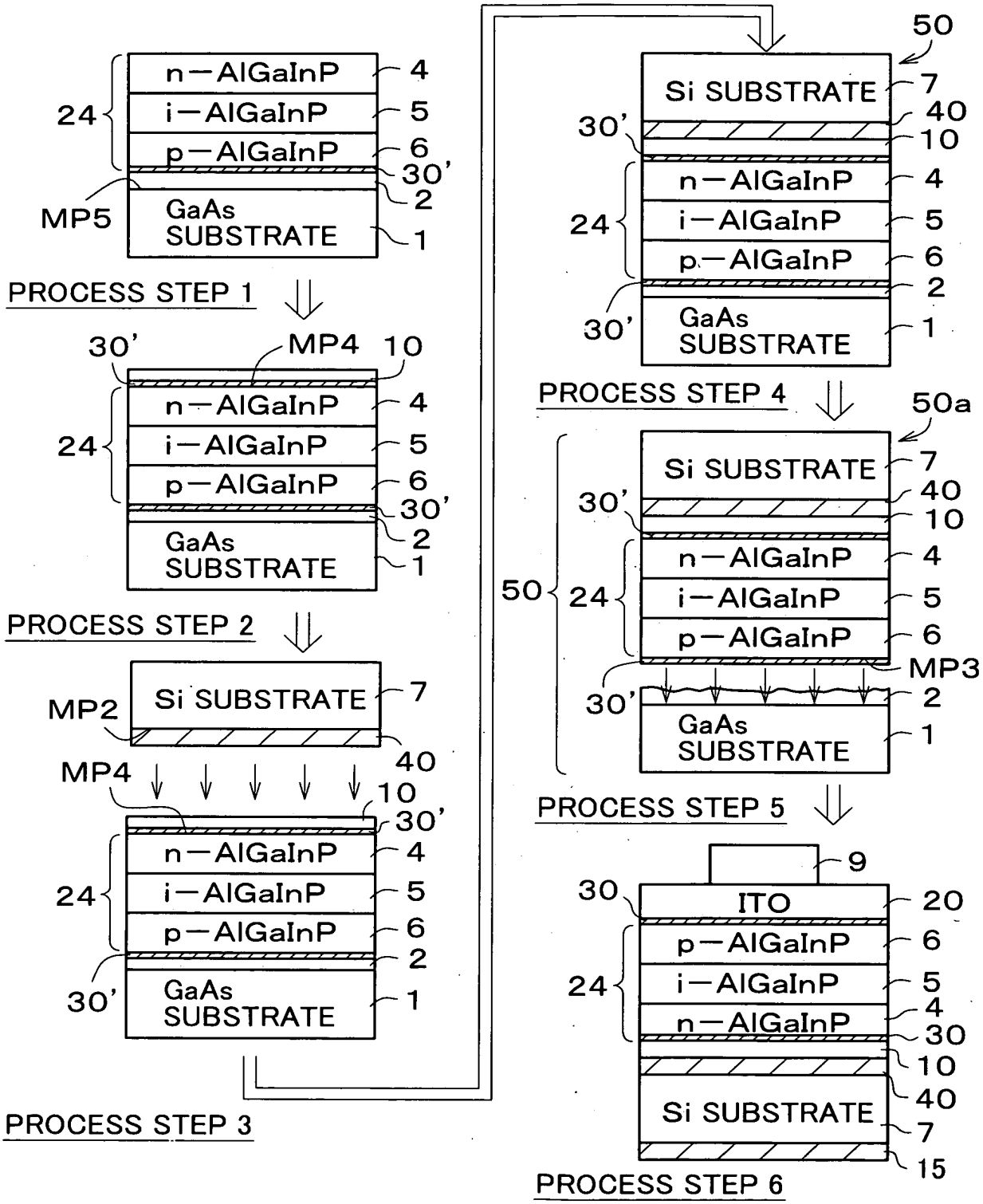

n—AlGaInP
i—AlGaInP
p—AlGaInP
GaAs SUBSTRATE
24
MP5
4
5
6
30'
2
1
PROCESS STEP 1
MP4
10
PROCESS STEP 2
Si SUBSTRATE
MP2
7
40
PROCESS STEP 3
50
PROCESS STEP 4
50a
MP3
50
PROCESS STEP 5
9
ITO
20
30
PROCESS STEP 6
15

FIG.26

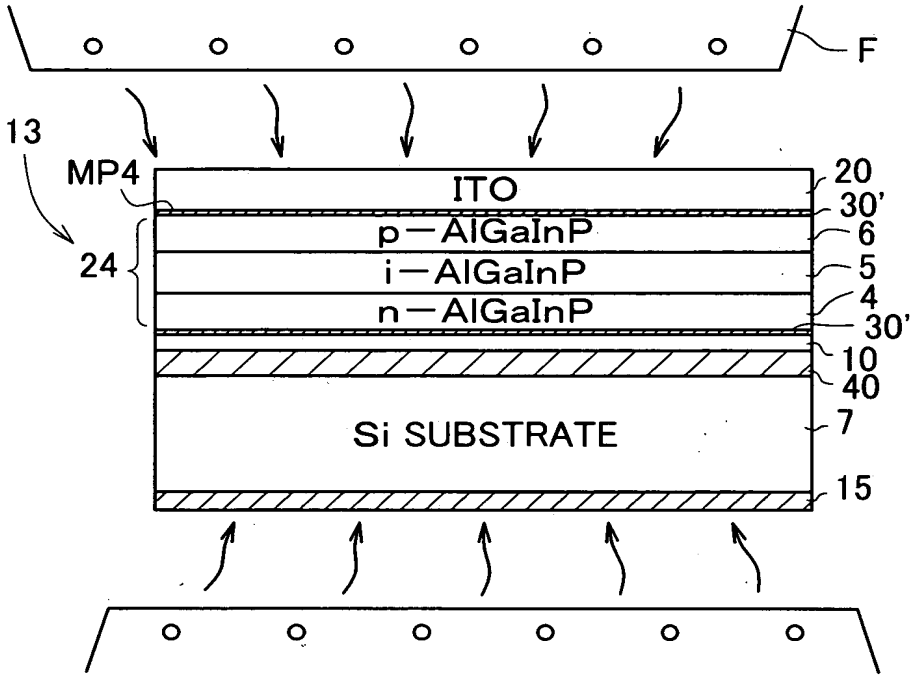

F
13
MP4
24
ITO
p—AlGaInP
i—AlGaInP
n—AlGaInP
Si SUBSTRATE
20
30'
6
5
4
30'
10
40
7
15

FIG.27

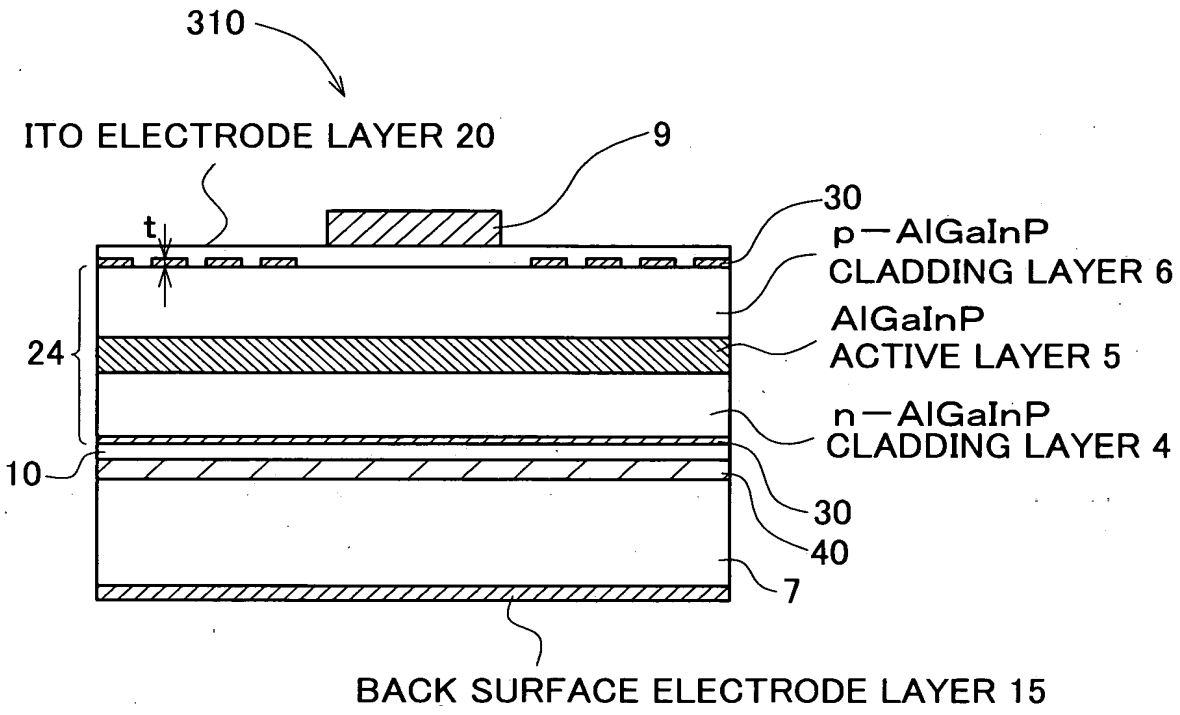

310
ITO ELECTRODE LAYER 20
9
t
30
p−AlGaInP
CLADDING LAYER 6
AlGaInP
ACTIVE LAYER 5
24
n−AlGaInP
CLADDING LAYER 4
10
30
40
7
BACK SURFACE ELECTRODE LAYER 15

FIG.28

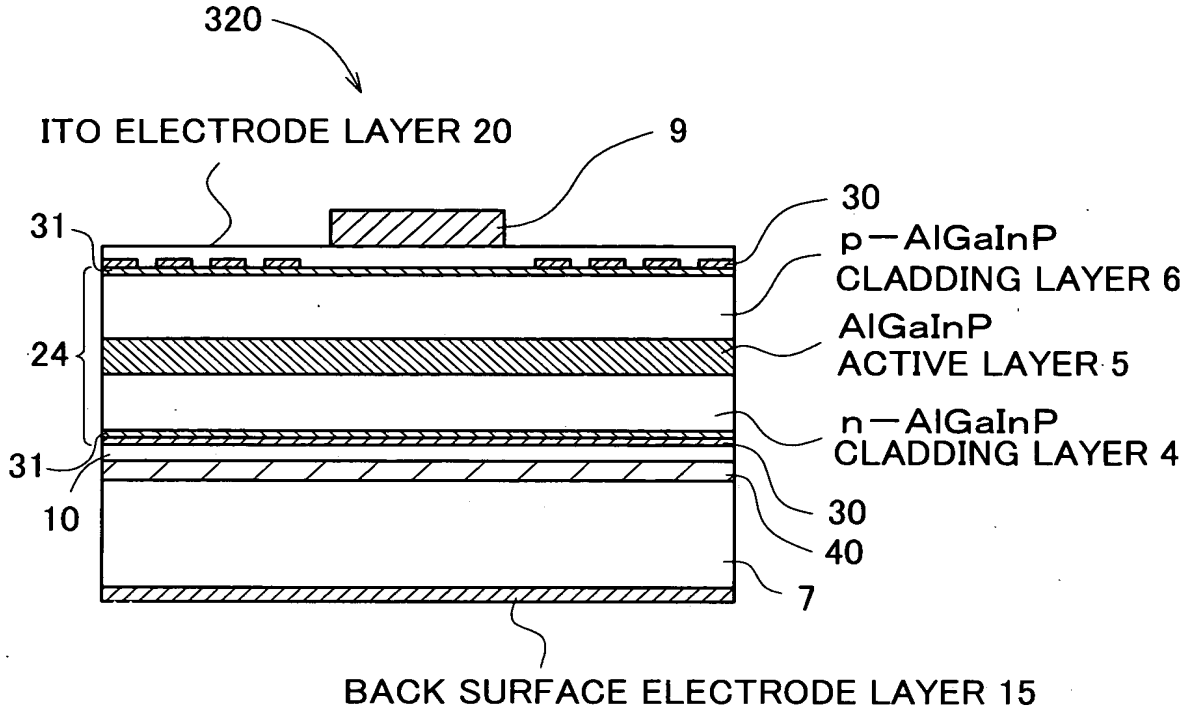

320
ITO ELECTRODE LAYER 20
9
30
p—AlGaInP
CLADDING LAYER 6
AlGaInP
ACTIVE LAYER 5
n—AlGaInP
CLADDING LAYER 4
31
24
31
10
30
40
7
BACK SURFACE ELECTRODE LAYER 15

FIG.29

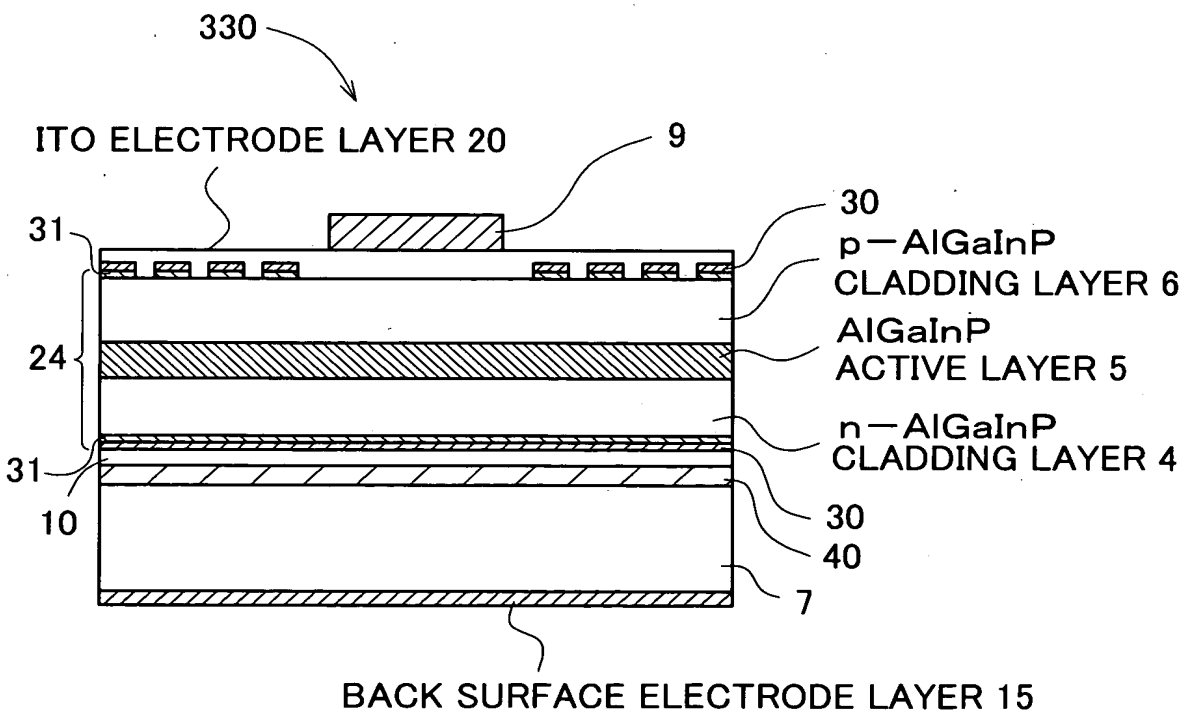

330
ITO ELECTRODE LAYER 20
9
30
p—AlGaInP
CLADDING LAYER 6
AlGaInP
ACTIVE LAYER 5
n—AlGaInP
CLADDING LAYER 4
31
24
31
10
30
40
7
BACK SURFACE ELECTRODE LAYER 15

FIG.30

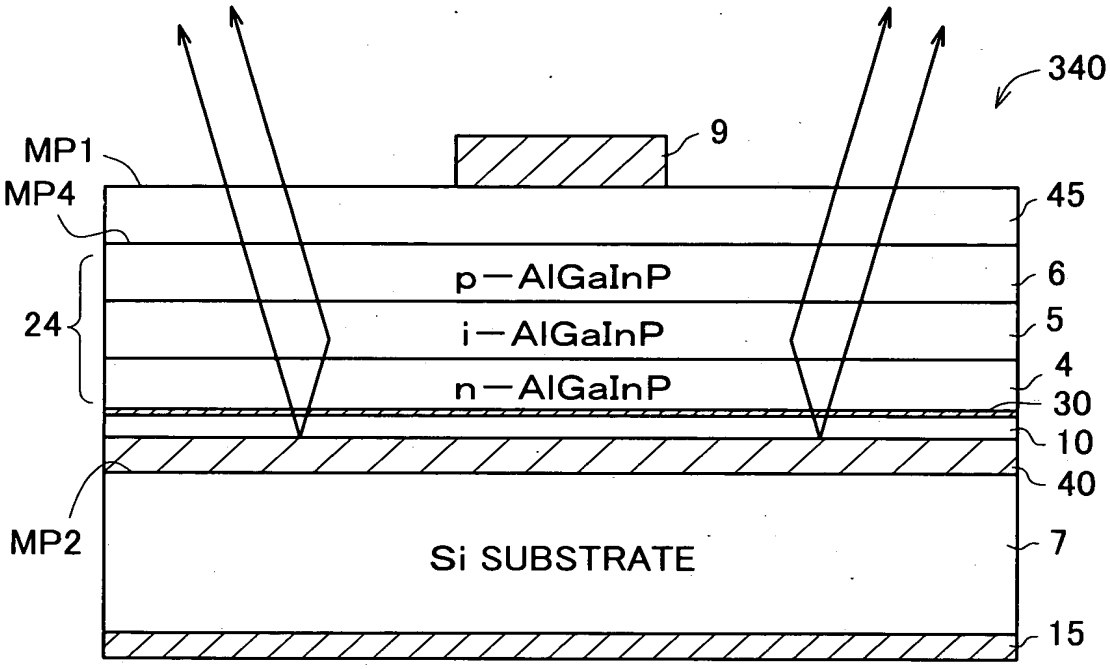

340
9
MP1
MP4
45
p—AlGaInP
6
24
i—AlGaInP
5
n—AlGaInP
4
30
10
40
MP2
Si SUBSTRATE
7
15

FIG.31

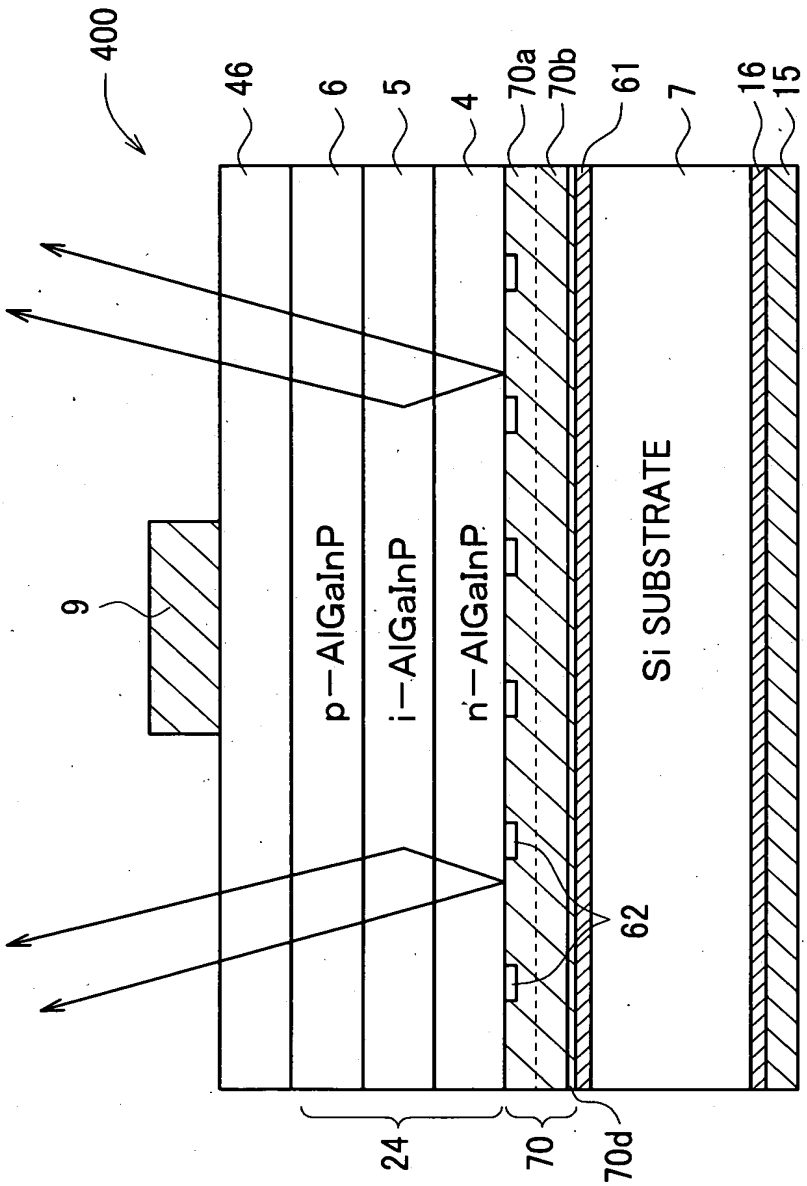

400
46
6
5
4
70a
70b
61
7
16
15
9
p−AlGaInP
i−AlGaInP
n−AlGaInP
Si SUBSTRATE
62
24
70
70d

FIG.32

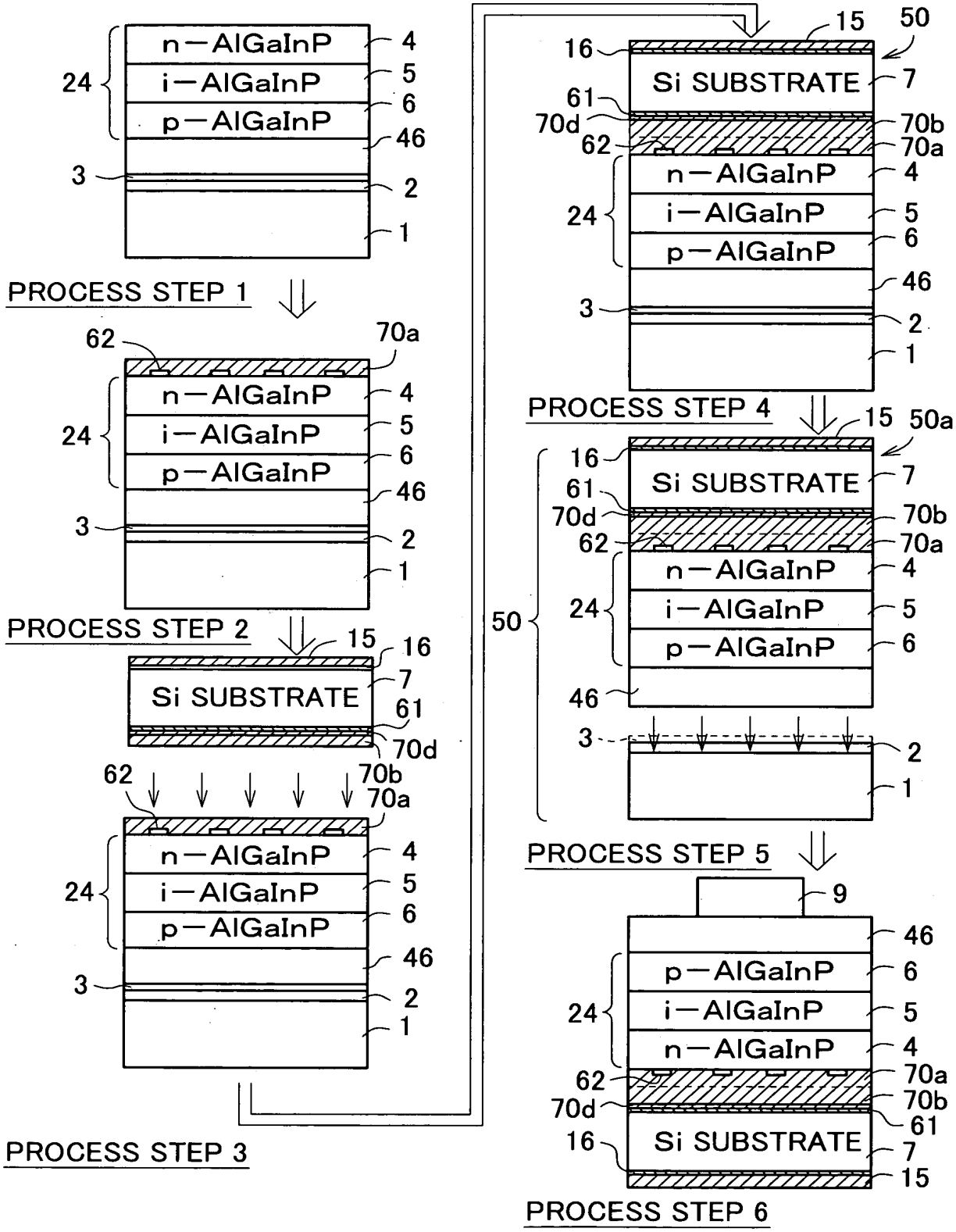

n−AlGaInP
i−AlGaInP
p−AlGaInP
24
4
5
6
46
3
2
1
PROCESS STEP 1
62
70a
PROCESS STEP 2
15
16
Si SUBSTRATE
7
61
70d
70b
PROCESS STEP 3
50
PROCESS STEP 4
50a
PROCESS STEP 5
9
PROCESS STEP 6

FIG.33

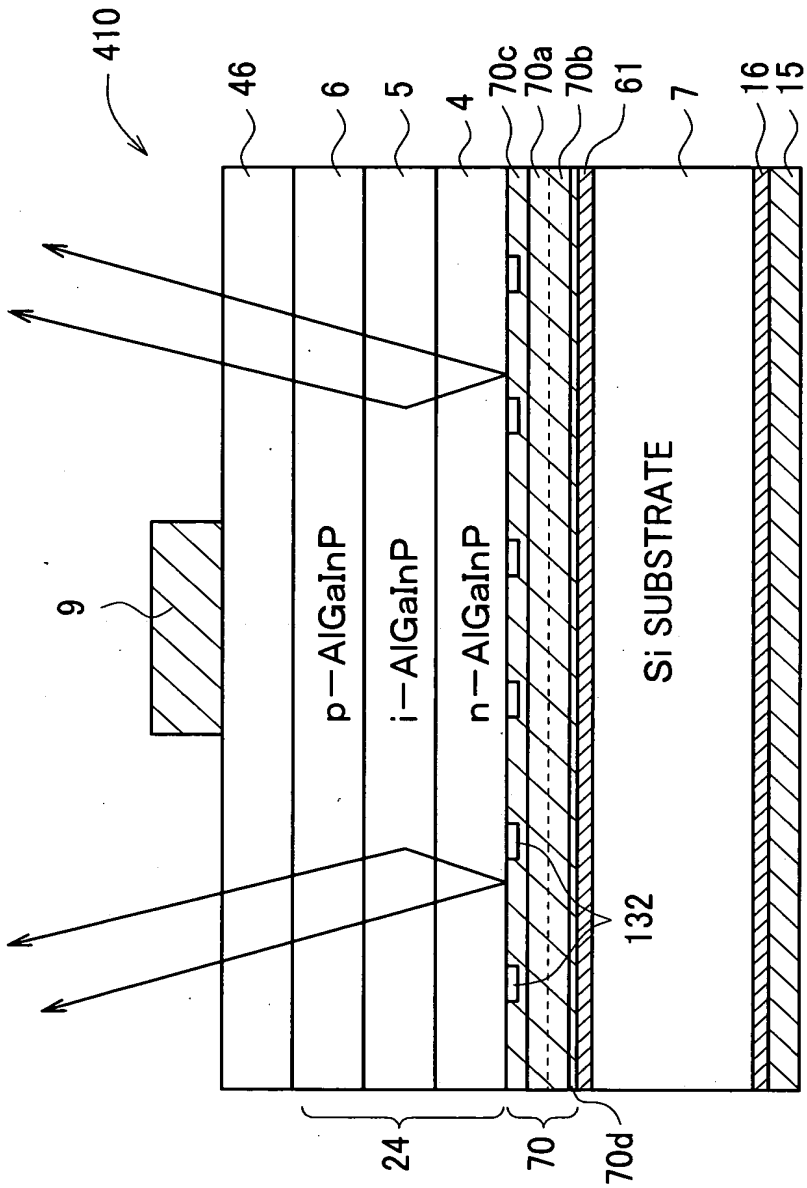

410
46
6
5
4
70c
70a
70b
61
7
16
15
9
p−AlGaInP
i−AlGaInP
n−AlGaInP
Si SUBSTRATE
132
24
70
70d

FIG.34

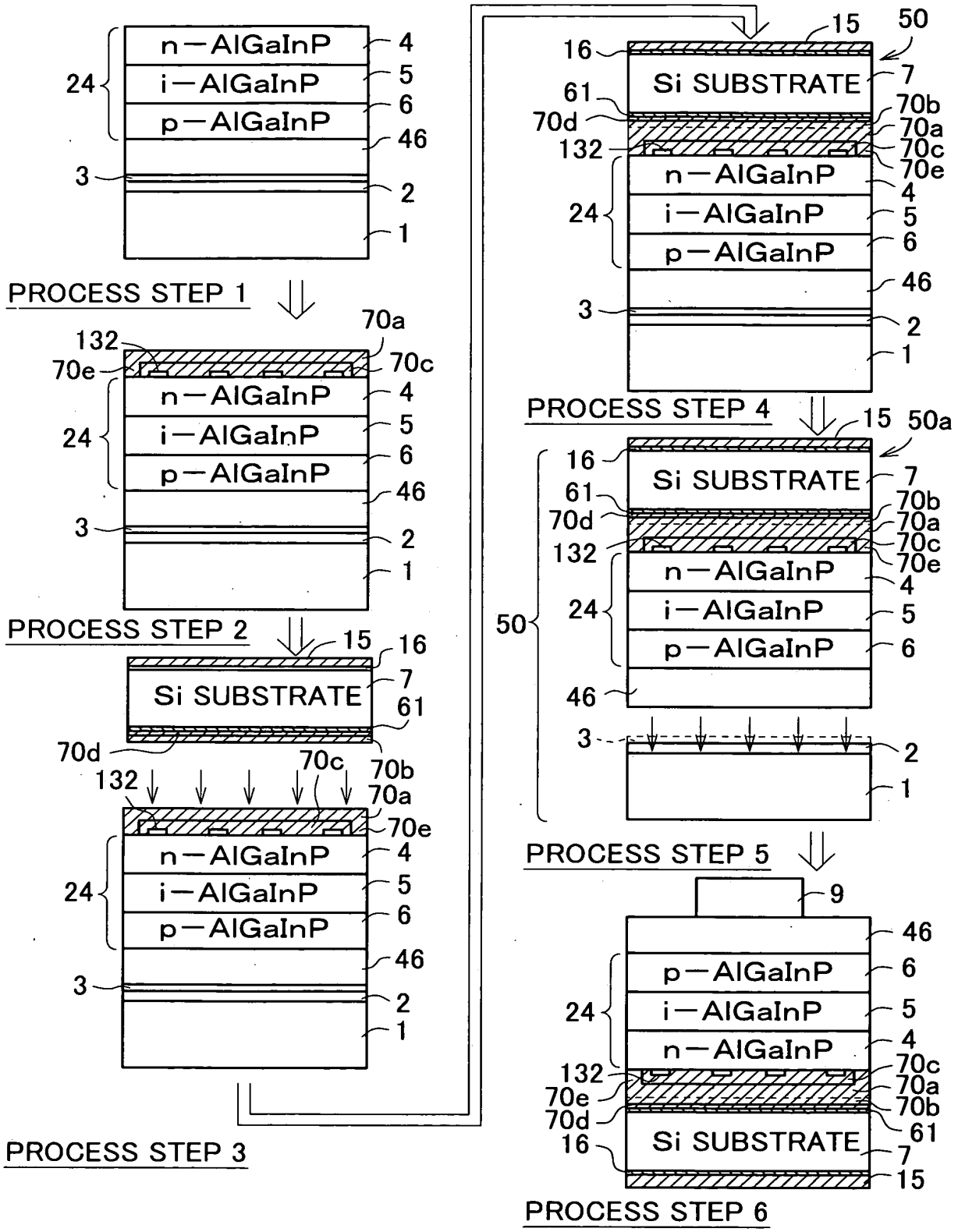

n−AlGaInP
i−AlGaInP
p−AlGaInP
24
3
4
5
6
46
2
1
PROCESS STEP 1
70a
132
70e
70c
PROCESS STEP 2
15
16
Si SUBSTRATE
7
61
70d
70b
PROCESS STEP 3
50
PROCESS STEP 4
50a
PROCESS STEP 5
9
PROCESS STEP 6

FIG.35

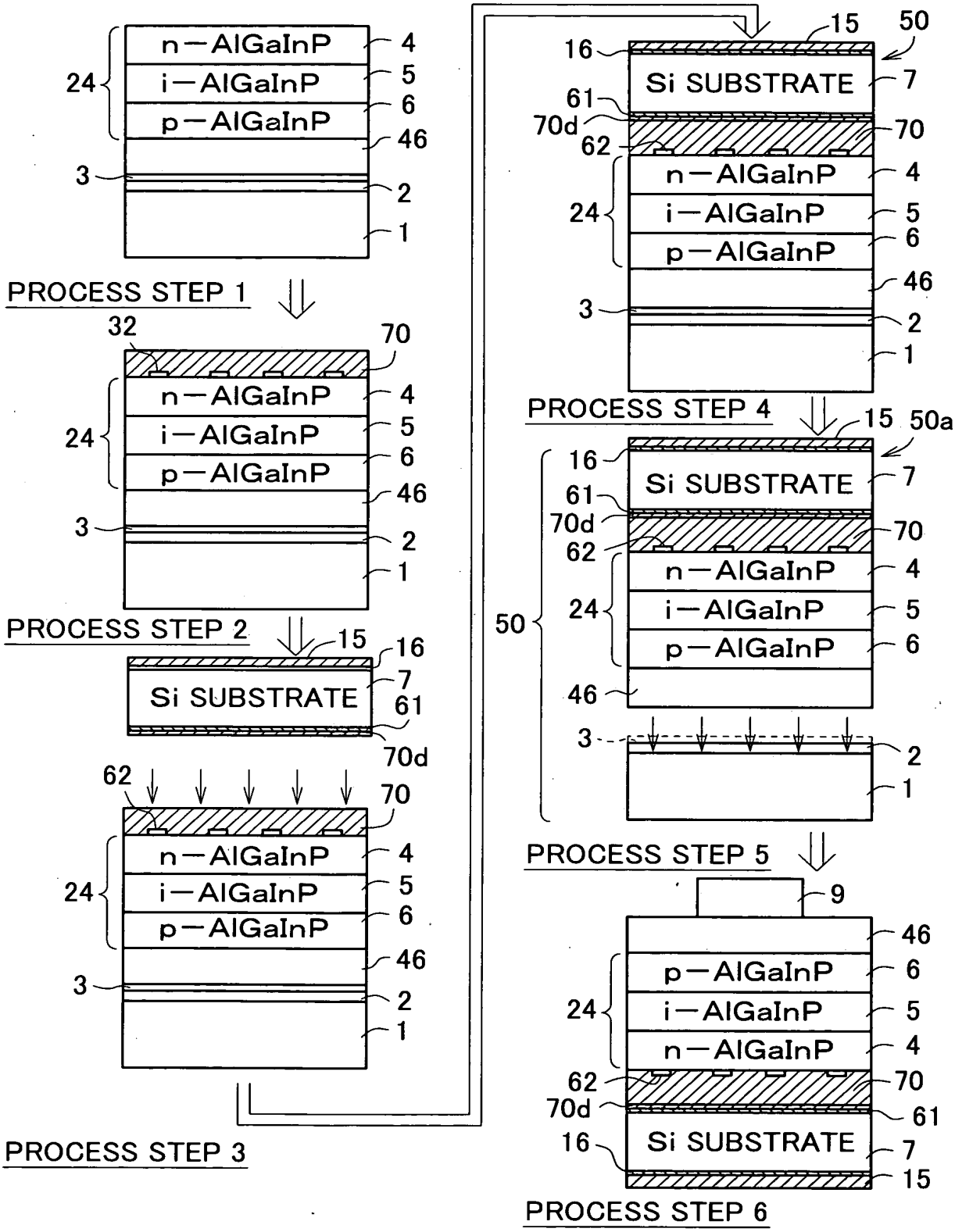
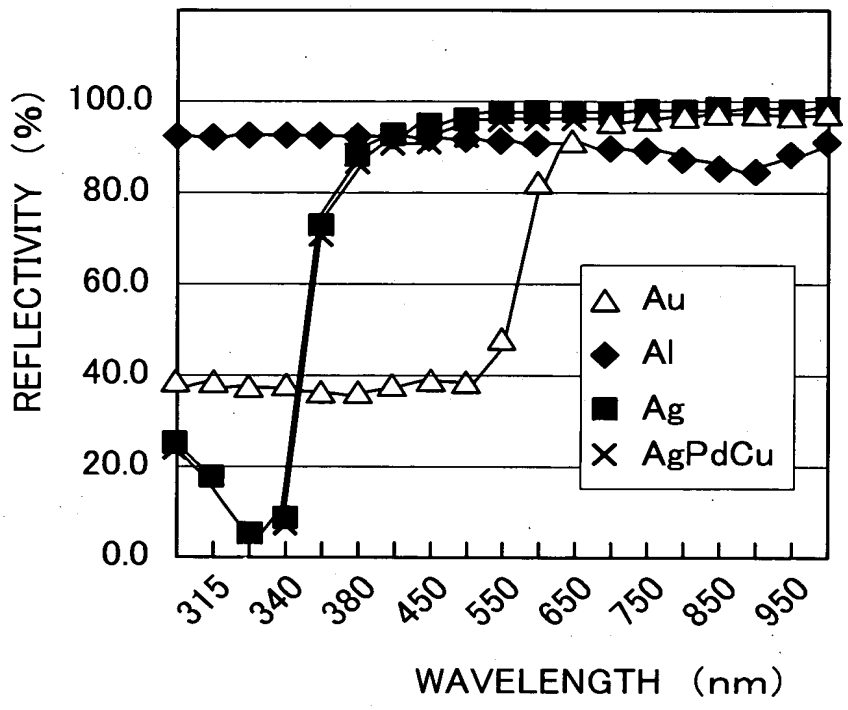

n−AlGaInP
i−AlGaInP
p−AlGaInP
24
4
5
6
46
3
2
1
PROCESS STEP 1
32
70
PROCESS STEP 2
15
16
Si SUBSTRATE
7
61
70d
62
PROCESS STEP 3
50
PROCESS STEP 4
50a
50
PROCESS STEP 5
9
PROCESS STEP 6

FIG.36


REFLECTIVITY (%)
100.0
80.0
60.0
40.0
20.0
0.0
315
340
380
450
550
650
750
850
950
WAVELENGTH (nm)
Au
Al
Ag
AgPdCu